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No. 5

A REPRINT OF THE PALEONTOLOGICAL WRITINGS OF THOMAS SAY;
WITH AN INTRODUCTION

BY

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A REPRINT OF THE PALEONTOLOGICAL WRITINGS OF THOMAS SAY;

With an Introduction by G. D. Harris.

INRTODUCTION.

For several years past we have been endeavoring to decide upon the most feasible plan for rendering the paleontological literature of America, especially that from 1800 to 1860, more accessible to young students. Digests of the paleontological work of each decade have been thought of; reprints of the paleontological matter in each periodical, transactions, or journal have been considered, but not favorably. All digests, adaptations or condensations of works dealing with the systematic side of natural history have seemed but delusions, and fraught with grave dangers; for, what two persons would cull out the same passages as worthy of going into a digest of an author's writings! —the author alone knew just what he wanted to say and how to say it.

Surely, no scholar will ever rest contented with an abridged form of any author's works; he must have the real thing. But if the real thing is beyond his means and there are no magnificent libraries to which he has access, what is he to do? There seems to be but one really satisfactory solution to the difficulty, *viz.*, a republication of each author's work, exactly as he wrote and punctuated it, word for word, line for line, page for page, and plate for plate, regardless of the publication in which it first appeared.

The present Bulletin contains the paleontological writings of one of America's greatest naturalists, and may well serve as an initial number to the many of its kind we hope from time to time to be able to bring out. Doubtless some will believe that it is means thrown away to republish these short and seemingly unimportant articles. Yet we believe such not to be the case. More than once have our European co-workers overlooked Say's original description of *Exogyra* and credited the genus to Sowerby; too often has Say's work on "Crinoidea" been forgotten.

Again, we have paid a dollar for a very poor and shattered set of merely the plates herein republished.[*] Upon the whole, then, it would seem that the desirability of this republication cannot well be questioned.

From our introductory statement, it must not be hastily inferred that paleontological writings from 1800 to 1860 only are difficult to obtain. On the contrary, some important articles published in State survey reports or in the proceedings of societies as late as 1885 or later are now out of print and very hard to obtain. These must sooner or later be printed again or the advancement of paleontological science will be seriously impeded.

Original investigations, if well directed and thoroughly made, are sure of receiving their merited praise, and are indeed, helpful to science. The humble task of republication has fewer attractions, but who can point out the way in which the study of paleontology can be forwarded more than by making its literature accessible, at a very moderate cost, in a most convenient form?

List of Say's Writings herewith Republished.

Fossil Zoology, &c. 5–11
Am. Jr. Sci., 1st Ser., Vol. I, 1819.
Fossil Zoology 12–23
Am. Jr. Sci., 1st Ser., Vol. II, 1820.
Fossil shells found in a shell mass from Anastasia Island ... 25–28
Jr. Ac. Nat. Sci. Phila., 1st Ser., Vol. IV, 1824.
An account of some of the fossil shells of Maryland 30–76
Jr. Ac. Nat. Sci. Phila., 1st Ser., Vol. IV, 1824.
Crinoidea 77–84
Jr. Ac. Nat. Sci. Phila., 1st Ser., Vol. IV, 1825.

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[*] The plates of this Bulletin are photo-engraved from this set. They are about four-fifths the dimensions of the originals.

FOSSIL ZOOLOGY, &c.

ART. XII. *Observations on some Species of Zoophytes, Shells, &c. principally Fossil, by* THOMAS SAY.

IF the following descriptions and notices of some of the animal productions of our country, chiefly fossil, and of which some are but little known, should be found of sufficient interest to occupy a place in the Journal of Science, they are very much at your service for that work.

[A. J. S., 1st Ser., Vol. I, 1819.]

The greater portion of them are extracted, with some modification, from an essay which I read about three years ago, to the Academy of Natural Sciences, without any intention at the time of giving publicity to them. But the rapid diffusion of a taste for geological research, seems to require corresponding exertions on the part of those who have attended to fossil remains, inasmuch as geology, in order to be eminently furnished with every advantage that may tend to the developement of many important results, must be in part founded on a knowledge of the different genera and species of reliquiæ, which the various accessible strata of the earth present. The accessory value of this species of knowledge, in now duly estimated in Europe, as affording the most obvious means of estimating, with the greatest approximation to truth, the comparative antiquity of formations, and of strata, as well as of identifying those with each other which are in their nature similar.

Certainly very little is yet known about the fossils of North America, and very little can be known accurately, until we shall have it in our power to compare them with approved detailed descriptions, plates, or specimens of those of Europe; which have been made known to the world by the indefatigable industry, and scientific research of Lamarck and other naturalists.

America is rich in fossils. In many districts of the United States, vast beds of fossil shells, zoophytes, &c. are deposited, which, for the most part, are concealed from the inquiring eye, offering superficially a mere confused mass of mutilated fragments. These rich repositories must finally be exposed to view, by the onward pace of improvement, and the more interior strata will be unveiled by some fortunate profound excavations, the result of enterprise in the pursuit of gain. The very surface of the country in many regions, is almost overspread with the abundance of casts, or redintigrate fossils, many of which are apparently specifically anomalous, and some generically so. The correct, and only useful mode in which the investigation of our fossils can be conducted, is attended with some difficulty and labour.

The task presumes the knowledge, not only of fossils in all their different states, from the apparently unchanged specimen, to the fragment or section of a cast uninsulably imbedded in its rocky matrix, but it also requires an adequate acquaintance with recent specimens, or those of which the inhabitants are not yet struck from the list of animated beings, in other words those of the present, as well as those of the former world.

Due advantage being taken of the many opportunities which are from time to time offered to us, of obtaining knowledge in this department, will probably be the means of producing a list of American animal reliquiæ, coextensive with that of Europe at the present day. In the present state of the science, however, the correct naturalist will feel it a duty which he owes to his colaborators to proceed with the utmost caution, that he may not add unnecessarily to the already numerous species.

Genus Alveolites, Lam.

Coral lapideous, covering extraneous bodies, or in a simple mass, formed of concentric strata; strata composed each of a union of numerous alveoles, which are very short, contiguous, reticulate, and generally parallel.

Species.

A. glomeratus, alveoles vertical, subequal, oval, or obsoletely hexagonal, much shorter than the diameter, parallel; paries simple; strata numerous, forming a rounded mass. (*Cabinet of the Academy of Natural Sciences.*)

Found often on the coast of North America, cast up by the waves, the animals sometimes still living. Forms masses of various sizes and figures, generally more or less rounded or lobed, and composed of a great number of concentric layers. The number of these strata seems to be regulated in some degree, by the quantity of surface they have to cover. Thus if the nucleus happens to be a small shell, such as the *Naticæ*, *Nassæ*, &c. of our coast, or even the oyster, (*O. virginica*,) clam, (*V. mercenaria*,) &c. the strata are often very numerous;

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but on the thoracic plate of *Limulus polyphemus*, having a considerable space over which to extend themselves, the strata are but few, not more than 2 or 3. I have seen the thoracic plate of this animal so entirely covered by the *Alveolite*, as to have the eyes and stemmata concealed so as to be perfectly blind. When composed of a single layer only, it much resembles a *Flustra*, or a *Cellapore* of which the convex surfaces have been removed by attrition. The animal I have not yet examined. The alveoles or cells of a layer, are arranged in lines of different degrees of curvature, obscurely radiating from different centres; these lines are placed side by side, the alveoles alternating with each other throughout the layer in a quincunx manner; the thickness of the paries is somewhat equal to one half of the conjugate diameter of the alveole, the length of which, or thickness of the layer, is scarcely more considerable; but these proportions vary.

The species to which it seems allied, are *madreporacea* and *incrustans*. The former is fossil, and differs in being subramose; the latter forms but a single expansion.

Genus Favosites, Lam.

Coral lapideous, simple, of a variable form, composed of parallel prismatic and fasciculated tubes; tubes contiguous, pentagonal, or hexagonal, more or less angular, rarely articulated.

Species.

F. striata, more or less turbinate; *paries of the alveoles* longitudinally striated within, and fenestrate with minute osculi; *alveoles* with very numerous septæ. (*Cabinet Acad. Nat. Sciences; and Peale's Museum—common.*)

Found fossil in various parts of the United States, at the falls of the Ohio; Genessee, New-York; Pittsburg and Wilksbarre, Pennsylvania; Missouri, &c. &c. but not yet in the alluvial deposit of New-Jersey.

The tubes are generally, partially, or entirely filled with silicious matter, sometimes so completely so, as to resemble in miniature, basaltic columns; when the alveoles are free on the surface, these fossils are known by the name of *petrified wasp-nests*, from the resemblance they bear to the nests of those insects. The silex is usually only infiltrated into the cavities, leaving the substance of the coral in its original calcareous state, but the specimens which are found amongst the rolled pebbles of the Delaware River, near Philadelphia, are completely silicified.

The size varies from one fourth of an ounce, to two hundred pounds or more, and the tubes occur of every intermediate diameter, from the fortieth to one fourth of an inch. It is not common to find any two specimens of like form, they are, however, ordinarily more or less turbinate, but are sometimes depressed or compressed, and the tubes rectilinear or excurved, and of various lengths. The dilated summit is not so much the effect of a gradual enlargement of the tubes, as of the frequent and adventitious interposition of young ones, which of course renders the openings of the tubes unequal. The tubes or alveoles, vary in the same coral, being 5 or 6, rarely seven sided, but the hexagonal form is most common; the interior of a tube is divided into a great number of apartments or cells, by approximate transverse septæ, each of the cells appears to be connected with the corresponding cells of the surrounding tubes, by lateral orifices in the dividing paries; these orifices are minute, inequidistant, orbicular, their margins slightly prominent, and forming from one to three longitudinal series on each side of the tube; each row is separated from the adjoining one by an impressed line. By means of these osculi it seems probable that all the animals inhabiting a common coral, were connected together, or had free communication with each other, but whether by means of a common organ as in *Pyrosoma*, *Stephanomia*, &c. or simply by contact as in the aggregating *Salpa*, &c. we have no means of determining.

The *striata* differs from *Madrepora truncata*, Esper. (*F. alveolata*, Lam.) in not being "extùs transversè sulcata." It seems to be allied to *Corallium Gothlandicum*, Amœn. Acad. v. 1. p. 106, and it is possible it may prove synonymous, or very similar to it, when that species becomes better known;

the latter has been taken for Basalt, and M. Lamarck when describing it, inquires "Est-ce un polypier?" *Madrepora fascicularis*, of Volck. and Parkin. in common with *F. striata* and *F. Gothlandicum*, is distinguished by the transverse septa, a character which induced me to refer the species here described to *Favosite;* they seem therefore to be congeneric, as analogy indicates a participation in the character of osculated paries.

Amongst the great variety exhibited by this species, we have to remark more particularly the following, viz.:

1st. Alveoles perfectly free, that is, destitute of aciculi or lamellæ, the septa wanting, and sometimes the osculi obsolete.

2d. Alveoles filled almost to the summit with the septa, and resembling those combs of the bee-hive which are filled with honey and covered over.

3d. Paries beset with very numerous, interrupted, alternating, transverse lamellæ, which are denticulated at their tips, and project towards the centre with various degrees of prominence and irregularity.

The first variety corresponds with the generic character, and the third approaches the genus *Porites;* yet so unequivocally identical are they, that I have seen them all united in the same mass, and perforated throughout by the osculi. The identity is further obvious by the perfect gradation which renders them inseparable.

With respect to the transverse septa, I think their presence may be accounted for by supposing that as the animal elongates its tube in consequence of an increase of growth, or in order to maintain an equal elevation with the adjacent tubes, (rendered necessary by the origin of young tubes in the interstices) it gradually vacates the basal portions of its tube, and sustains itself at the different elevations by successively uniting the parietal lamellæ so as to exclude the vacuity. That this is probable, we may infer from a similar procedure on the part of several species of testaceous mollusca. Thus some Linnæan *Serpula* become camerated, and a familiar instance presents itself in the *Triton tritonis*, the animal of which adds successive partitions to the interior of the spire, as that part becomes too strait for the increasing volume of its body. If the above supposition proves correct, the organs of communication which pass through the osculi, can hardly be in common, but must rather connect the animals by simple contact only, otherwise these parts would be broken when the animal changes its place by vacating the inferior part of the tube.

The third variety is then the state of that portion of the tube which is inhabited by the body of the animal, and not yet interrupted by the septæ.

From the above observations, it is evident that this species, and probably the entire genus *Favosite* under which I have placed it, will not arrange properly with the *Tubipores*, *Millepores*, &c. but must be transferred to the *Polypiers Lamellifères* of Lamarck. And if the *Madrepora retepora* of Solander and Ellis, is a true *Porites*, as M. Lamarck supposes it to be from the appearance of its tubes, I should conclude this genus to be very proximately allied to *Favosites*, by that species and the *F. striata* having in common the remarkable character of fenestrated paries. But to this character I should conceive a generic importance ought to be attached, as indicating a differential organization of the artificers. I have no doubt that on close inspection of a perfect specimen, the same character will be found to exist in *F. Gothlandicum*, and possibly also in *F. truncata*, if not in the latter only, it may be proper to separate the genus and to withdraw from *Porites* the forementioned species, retaining to *striata* as specifically essential, the second member of the differential description.

(*To be continued.*)

FOSSIL ZOOLOGY.

ART. IV. *Observations on some Species of Zoophytes, Shells, &c. principally Fossil, by* THOMAS SAY, *of Philadelphia.*

(Continued from Vol. I. p. 387.)

Genus Catenipora, Lam.

Coral lapideous, composed of parallel tubes joined together in vertical laminæ; laminæ anastomosing into a network.

Species.

C. Escharoides, Lamarck, millepora. (*Tubipora catenularia,*) American Acad. vol. 1. p. *Tubipora catenulata*, Gmel. &c. (*Cabinet Acad. Nat. Sciences; and Peale's Museum.*)

[A. J. S., 1st Ser., Vol. II, 1820.]

Fossil in different parts of the U. States, particularly at the falls of the Ohio river and in Ulster County, New-York. From this last locality, Mr. C. W. Peale obtained some fine specimens when digging for bones of the Mastodon.—Has not yet occurred in the alluvial deposit of New-Jersey.

Each tube is divided into numerous cells by transverse septæ, precisely as in the *Favosite.* Mr. Parkinson, in his Organic Remains 2, p. 21, remarks, that minute openings are observable in the sides of the tubes; these are not distinct in the specimen under examination, owing perhaps to its being entirely silicified, though an equivocal appearance justifies the belief of their having existed; and if so, the analogy is very strong with the *Favosites.* A species of *Turbinolia* is implanted in the specimen under examination.

Pentacrinus caput—Medusæ.

Of this very remarkable and rare animal, a specimen occurs in the collection of the Museum of South Carolina; it was brought from the Island of Gaudaloupe by Mr. L'Hermenier. This is, I believe, the fourth recent specimen known, of this family of extinct animals: of the two other individuals one is in the French, and the others in British collections.

The well known fossil animal supposed to be of this family, so common near Huntsville and in some parts of Kentucky, and which has been figured and described by Parkinson, cannot be properly arranged under either of the genera. These vary in form and size. I have seen four very distinct varieties, but it is possible they may have belonged to different parts of the same pedicel.

Although this fossil is familiar to the observation of Naturalists, yet it does not appear that any particular name has been appropriated to it, or that it has been assigned to any definitive place in the systems.

From its peculiar appearance, persons who have not devoted their attention, to the affinities of natural objects, have regarded it as a petrified *nut* or *Althea bud*, and from the ambiguity of its characters, or the obliteration of its sculpture, naturalists have hesitated to indicate its family, or kindred generic group.

Parkinson is the first author who has figured and described this animal remain. He refers it to the genus *Encri-*

nus under the name of *Kentucky Asterial fossil*, but at the same time and subsequently, he expresses himself doubtfully, as to the propriety of that arrangement. His specimens were not so perfect as to exhibit the basal articulating radii, and the sutures and ossiculæ were perhaps obliterated, as they were unnoticed.

The examination of numerous specimens, in the collection of the Academy of Natural Sciences, collected by Mr. Samuel Hazard, near Huntsville, affords me an opportunity to corroborate the correctness of that arrangement.

But I am induced to believe, notwithstanding the imperfection of our knowledge of these animals, that the genus as it now stands, needs the reforming hand of the systematist, that it is in reality a natural family, including several perfectly distinct genera of many species, the individuals of some of which, as their remains testify, were immensely multiplied in the ancient world.

Actuated by this conviction, I submit to the decision of Naturalists, the propriety of separating the asterial fossil, from the genus Encrinus, as the type of a distinct genus, under the following name and characters.

Genus Pentremite.

Body subglobular or oblong, elevated upon an articulated trunk ; *pelvis* (Parkinson) pentagonal, more or less abruptly attenuated to the base ; *ambulacra* (Lam.) five, incomplete, radiating from the summit and terminating each side at the angles of the pentagon, each with numerous transverse striæ, a longitudinal indented line, two sutures, and numerous transversed impressed lines, which alternate with a marginal series of oblique pores ; *interstitial spaces* (included between the ambulacra) triangular, equal, with a longitudinal suture ; *apex* perforated by five rounded foramina, and an angulated central one ; *ossa innominata* (Park.) large, rhombic. TRUNK branched? cylindrical, articulated, elongated ; *segments* perforated, articulating surfaces with alternately elevated and depressed radii.

A transient view of the superior portion of this reliquium, presents a considerable resemblance to the Echinii, by the apicial foramina, and by the radiating ambulacra which are somewhat similar to a pentapetalous flower. But an attentive examination of its characters, exhibits its inseparable connection with the family of Encrinites by the analogy of its mode of support, its rectilinear sutures, and the general form of its pelvis or basal portion.

To the base is generally attached, the single superior joint of the trunk or vertebral column; this joint is short, and is longitudinally divided by three sutures, which radiate from a central foramen; its inferior articulating surface is orbicular, with numerous marginal radii, and the centre exhibits the opening of the foramen; at its junction with the ossa innominata it is somewhat trilobate. The ossa innominata are of a rhomboidal form, sometimes pentagonal or subquadrate. The pelvis has the same general form with that of the *Encrinus liliiformis*, but the angles of the pentagon are much more acute, and those parts which Parkinson denominates *ribs*, *clavicles* and *scapulæ* are not distinct.

From the superior angle of each of the ossiculæ of the base, a *suture* ascends, bisecting each of the interstitial spaces, and is divaricated near the tip, so as to give to those triangular spaces, a rhombric termination. Each of the five outer foraminæ, (of which one is invariably much the largest) is the common aperture of two tubes which penetrate to the tips of the ambulacra, immediately beneath the sutures of those parts, and which are not visible but by dissection; the central foramen is stellate.

The peculiar adaptation of these various parts to each other, may have permitted their independent movement, in order that the animal might assume some form of expansion; but we are led to suppose that this motion could not have been very considerable, from the relative situation of the sutures. And I may further add, that, as we have no direct proof that this animal did possess the power of expanding, it may be, that the motion of its body was confined to the protrusion of tentacula through the foramina, and perhaps smaller ones through the pores of the Ambulacræ.

This question, however, must remain for the solution of future observers, who may have an opportunity to examine them in situ, and of comparing together their different fragments which may be discovered. All the specimens which I have seen, about sixty in number, are in a perfectly similar collapsed state.

[A. J. S., 1st Ser., Vol. II.]

The several different appearances exhibited by specimens of the *Pentremite* may be thus defined—

1st. *Pelvis* abruptly attenuated, nearly horizontal—
Length from seven tenths to more than half an inch.
Kentucky Asterial fossil, Park. Org. Rem. vol. 2, pl. 13.
This is the most common.

2d. *Body* oblong; *pelvis* gradually attenuated; transverse elevated lines of the ambulacra, grooved—
Length from three fourths to one inch and one fourth.

3d. *Body* subglobular; *pelvis* hardly more attenuated than the superior portion—
Length about one inch—
Less common than the preceding ones.

In Peale's Museum a large specimen of the latter is preserved, of which the sutures, have each a parallel impressed line on each side; this specimen was brought from England by Mr. Reubens Peale, he was informed that it was found in the vicinity of Bath, but the fact is very equivocal.

A specimen of the second variety is in the collection of Mr. B. Say; it was presented to him several years ago under the name of *petrified althea bud*, and was dug up in a garden in the borough of Reading, Pennsylvania.

Mr. Z. Collins informed me that this fossil has been noticed and figured, by Dr. S. L. Mitchell, of New-York, as an *Echinus of the family* (genus) *Galerite*, and also as an *asterite*. See his geological observations in the New-York edition of Cuvier's theory as translated by Jameson p. 363, pl. 8. This figure indicates the above first variety.

Renilla Americana,

Is very common on the coast of Georgia and E. Florida, cast up by the waves.

Perna torta.

This large species of fossil Perna has been discovered at Upper Marlborough, in the state of Maryland, by Mr. J. Gilliams of this city. The hinge portion is very entire, but the anterior part, is more or less broken off, as is the case with those found in Europe and like them the substance of the shell is in a tolerable state of preservation, not having undergone much apparent change, excepting that the lamellary increments are readily separable and very friable, the epidermis also is wanting.

It is the same species of shell as that described and figured by Collini in his Journal p. 10, pl. 6. fig. 1. under the name of *Ostreum polyleptoginglimum;* and also anonymously by Parkinson Organ. Rem. vol. 3, pl.

The teeth of one specimen, in the possession of the Academy of Natural Sciences, are obsolete.

Collini says, it is often perforated by *sea insects;* our specimens are also penetrated, but the cavities are formed by an ampullaceous *Pholas*, which in reality may be the same as those which that author alludes to, by the term sea insects; it may be thus named and described.

Pholas ovalis.

Tube equal, entire and rounded at base, and gradually attenuated towards the anterior termination. *Shell* subovate, dehiscent; *valves* with crowded, acute, elevated, transverse lines, somewhat decussate with longitudinal slightly indented ones, a more conspicuous, longitudinal, indented line before the middle, posterior basal margin smooth; within equal, the posterior basal margin distinguished by a slight undulation.

This is not, strictly speaking, a *Pholas*, inasmuch as it is included in a tube; but in other respects it corresponds very well with the species of that genus, as far as I can judge from incomplete specimens, not having seen the accessory valves. It will not agree with *Teredina* Lam. as its valves are concealed by the tube; by which character it is assimilated to *Fistulana*, but from this genus also, it is distinguishable, by the form of its valves, and most probably, by being destitute of the anterior, crustaceous, branchial appendages or valvules, though it is proper to observe that the anterior extremities of the tubes (which contain these parts in fistulana, teredo, &c.) are deficient in my specimens of *P. ovalis.*

In the somewhat compact earth which was included between two fragments of the valves of the abovementioned *Perna*, were a few interesting shells, some of which are perfectly firm and entire, others, although to all appearance similarly circumstanced, are extremely friable, and even fatiscent. Amongst these I recognized a *Crepidula*, which differs from any I have seen, but is too imperfect to be described. A portion of an obtusely rugose incrassated, *Serpula.* A *Pecten* which does not appear to have attained to its complete growth. A small laminated *Cytherea*, Lam. a *Fissurella* allied to *F. græca*, but immature. A *Turritella*, and fragments of a *Balanus* of considerable size, several specimens of a *Nucula* and of a *Calyptræa.* The two latter may be described as follows.

Nucula obliqua, valves obliquely subtriangular, obsoletely striate transversely, one or two of the striæ more conspicuous, numerous, hardly perceptible longitudinal striæ; anterior and posterior sides forming an acute angle; *umbo* obtuse; *apex* acute; *teeth* angulated, prominent, cavity at the apex of the hinge profound, rather long; basal margin denticulatocrenate.

Greatest length one fifth of an inch.—

Very much resembles *Arca nucleus* Lin. but is a smaller species, and proportionally narrower towards the apex, the hinge teeth are also more prominent and the cavity at the apex of the hinge is proportionally larger.

Calyptræa costata, oval, convex, with numerous slightly elevated, equal equidistant costæ, and crowded obtuse, concentric lines, which are regularly undulated by the costæ; *apex* mamillated inclining to one side; *inner valve* pateliform, dilated, attached by one side to the side of the shell, acutely angulated at the anterior junction, and rounded at the posterior junction, and rapidly tapering to an acute tip, which corresponds with the inner apex of the shell.

Length nearly one inch—

Seems to approach, in its characters to the genus *Infundibulum* of Montf. but from the fatiscent state of the specimens, this cannot be acurately determined. No definite spiral suture is perceptible.

Genus Baculites, Lam.

Shells straight, cylindrical, compressed, slightly conic, divided within into transverse septa, which are sinuous or ramose on their margins and pierced with a siphunculus; siphunculus at one extremity of the longest transverse diameter.

Species.

1. *B, ovata*, elongated; transverse septa subovate, sixlobed and a smaller one behind; *lobes of the superior faces* of the septa, three on each side, with a minute one between each, dentated at their edges, anterior lobe, (nearest the siphuncle) small not sinuous, second lobe with a single projection each side and sinus at tip, third lobe dilated, with a small sinus each side and more obtuse and profound one at tip, posterior lobe hardly larger than the lateral intermediate ones.

Greatest diameter of the transverse section one inch and one fifth, smaller diameter seven tenths; length of the segment about half an inch.

The specimen is in the collection of Mr. Reuben Haines of this city, it was found on the Neversink hills, in Monmouth County, New-Jersey, it is a cast of three very entire segments, no vestige of the shell remaining. The dimensions are taken from the largest segment.

In point of form this species approaches *B. vertebralis*, *Lam*. particularly in the curvature of the transverse section, but it is somewhat more obtuse behind; another difference consists in the form of the lobes, which, in that species, as represented by Mr. Desmarest, are less symmetrical, destitute of the lateral processes and of the profound terminal sinus; that species also is very diminutive.

2. *B, compressa*, elongated, much compressed; *transverse septa* oblong-oval narrowed to each end; *lobes* dilated, dentated on their edges, each with from three to five sinuses each side and a very profound one at tip.

This description is taken from two fragments in the collection of the Academy of Natural Sciences, which were brought from the Missouri, one by Messrs. Lewis and Clark and the other by Mr. Thomas Nuttall. As they exhibit the appearance of having been violently compressed by fortuitous circumstances, I have not been able to obtain correct proportional dimensions of the species. But notwithstanding this distortion of form, I have much confidence in placing it next in specific affinity to *B. Knorriana*, Desm. as it has without doubt been naturally a much compressed shell, with the lateral edges not very unlike those of that large and remarkable species; from which, however, it is sufficiently distinct by the much developed form of the lobes.

In these specimens a considerable portion of the shell remains exhibiting its beautiful iridescent colours.

Mr. Nuttall gave me the following account of this species. It occurs in the ancient alluvium of the Missouri, or clay formation, reposing adventitiously on the chalk stratum of this region, and imbedded in the indurated shistose beds, amidst other shells, and in the beds which overlie more or less intimately the Xylanthrax or Surturbrand; they are gradually and regularly acuminated through a length of twelve or eighteen inches, being from three to four inches broad at the base and diminishing to less than half an inch, but a perfect apex or base has not yet been discovered.—They are of frequent occurrence, washed out on the banks of the river, from White river of the Missouri to the Mandans, but at the same time, locally and not uniformly distributed.

Genus Ostrea.

O. convexa, Oval, inequivalve; *inferior valve* remarkably convex, with a longitudinal indented line on one side, slightly auriculated, or rather, angulated each side of the hinge, a longitudinal, transversely wrinkled depression, each side before the hinge; *ligament cavity* oval, placed beneath the apex; *superior valve* suborbicular, flat or somewhat concave, radicated from the apex to the periphery, annual increments strongly marked; *hinge* each side before with transverse rugæ.

Length of the convex valve nearly three inches, breadth two and an half—depth about two inches. Cabinet of the Acad. Nat. Sciences.

A perfect specimen was found by Mr. S. Wetherill near Burlington, N. J. I have since obtained a ferruginated one at Mulliger Hill in the same state. It is remarkable for the great convexity of one of its valves, and by the angles each side of the hinge.—It closely approaches to the genus *Gryphæa*; the lower valve is even proportionably more convex than that of *Anomia gryphæa*, and is also furnished with the indented line or lateral lobe as in that shell, but the umbo is not prominent, the superior valve is as operculiform as that of the shell abovementioned, and indeed, with the exception of the less elevated umbo, it is almost as closely related to *Gryphœa* as the *G. dilatata* of Sowerby.

Genus Exogyra.

Shell inequivalve, inequilateral; *cicatrix* one, large, deeply impressed, subcentral; *inferior valve* convex, attached, umbo spiral, spire lateral, prominent, hinge with two parallel, transverse grooves; *superior valve* discoidal operculiform, umbo not prominent, revolving spirally within the margin, hinge with a single groove on the edge.

E. costata, *apex* lateral, with about two volutions; *inferior valve* convex, costate, transversely corrugated, costæ of the disk somewhat dichotomous, sometimes fornicated; *within*, a single profound cicatrix placed rather nearer to the inner side; *hinge* with two nearly parallel, profoundly excavated grooves, of which the inner one is shortest, and corrugated; *superior valve* flat, slightly concave, destitute of costæ, outer half exhibiting the increments, outer edge abruptly reflected from the inferior surface to the superior, but not elevated above it; *hinge* with a single groove on the edge; *cicatrix* profound.

Length four inches, breadth three and a half.—Cabinet of the Acad. of Nat. Sciences.—Peale's Museum.

This interesting shell is the largest and most perfect of its class, which has yet been found in the Ancient Alluvial deposit of New-Jersey. It is not uncommon. I have seen many specimens. They vary somewhat in the costæ, being sometimes almost antiquated, sometimes nearly smooth. The aged shells became extremely thick and ponderous.

It seems to differ from the genus *Gryphœa* by having been attached, and by the lateral situation of the spire; the hinge grooves also are parallel with the edge, so as to be transverse with respect to the shell, bearing some resemblance to those of some species of *Chama*.

Genus Terebratula.

T. plicata, suborbicular, convex, ten or twelve profound, longitudinal plicæ, the two middle ones of the siphunculated valve, slightly more elevated, and the corresponding ones of the opposite valve, slightly more depressed ; two or three more conspicuous incremental lines are continued so as to cross the projecting face of the siphunculated hinge margin, which is but slightly prominent.

Cabinet of the Acad. Nat. Sciences.

This handsome species was found in the New-Jersey Alluvium by Mr. S. Wetherill of Burlington. The folds are somewhat similar to those of *Plicatula plicata*. It resembles the *T. crumena* of Sowerby, in the form of its folds, and in their extending to the beak, but the middle of the front is very slightly elevated, with but two folds, instead of three as in the *crumena*, the sides also have two or more folds, instead of four or more, and the beak is not very prominent.

Belemnites.

These are often found in the New-Jersey Alluvium, sometimes entirely changed into chrystalized blue iron earth, (*Hydrate of iron*, of Judge Cooper.)

Ammonite.

A species of this genus was found in the abovementioned locality by Mr. Wetherill. It approaches nearest to *A. elegans* of Sowerby, but I have not seen a specimen sufficiently entire to determine its species with exactness.

Dentalium.

A species has been found in New-Jersey, near Mulliger hill, by Mr. A. Jessup, which seems to approach nearest to *D. sulcatus*, but as it has only about sixteen equal costæ it is more than probably a new species.

Turritella.

A species of this genus was found by the same gentleman with the preceding, in plenty. It approaches very closely to the *T. conoidea* of Sowerby and is most probably the same species.

I have seen several redintrigrate fossils from the New-Jersey Alluvium, amongst which I may mention a *Cucullaea*, *Lam*. which in general form resembles *C. Glabra*, length about one inch and three fourths, breadth rather more ; an *Arca*, about one inch wide ; a *Terebratula* which seems to approach nearest to *T. ornithocephala*, *Sowerby ;* a large species of *Terebratula* resembling the *F. ovoides* of the same author, excepting that it is very slightly truncated before. I found at Mulliger hill a *Natica* much changed by the ferruginous matter so abundant in that region ; length nine tenths of an inch ; and also a somewhat distorted impression of a *Mytillus*. Specimens of *Turbinolia*, Lam. often occur in different situations.

Description of a testaceous formation at Anastasia Island, extracted from notes made on a journey to the southern part of the United States, during the winter of 1822 *and* 1823. *By* R. DIETZ.

[READ JUNE 8, 1824.]

Anastasia Island, opposite St. Augustine, along the coast of East Florida, is about 10 or 12 miles from north to south, and about 1½ miles from east to west, and has, perhaps, not more than 10 or 12 feet elevation above the level of the ocean, and is from 2 to 3 miles distance from the shore.

A considerable portion of the northern, and, perhaps, the substratum of the remaining part of the island, is composed of an aggregate of fragments of various shells.

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[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

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By permission of my very esteemed and learned friend, Mr. Thomas Say, I add, as a valuable addition to the above paper, his notes of various shells composing that aggregated mass, viz.

Fossil shells found in a shell mass from Anastasia Island.

1. ARCA *pexata*, nobis. It is not a little singular that this shell, and the six next following, so common on our coast at the present day, should be found here in a fossil state.

2. ARCA *ponderosa*, nobis. This shell also, which is very common in the fossil state, is found recent on the southern coast. But I have not found any fossil specimens so large as a recent one in my cabinet.

3. ARCA *incongrua*, nobis. Several small fragments of a shell, which I believe to have been identical with the recent species of this name, occurred in the mass.

4. ARCA *transversa*, nobis. A tolerably perfect young shell, and many fragments of full sized individuals; but this species is not so abundant as either of the preceding.

5. LUTRARIA *canaliculata*, nobis. Three small portions of

the hinge margin of a species, which I believe to be the *canaliculata*. The greatest part of this shell is so thin, that we are not surprised that it should have been comminuted; we should, however, expect to find part of the umbo and the entire hinge fosset, but no trace of either has as yet been discovered.

6. MACTRA. Numerous fragments of a small species which is probably M. *lateralis*, nobis. All the specimens, however, when perfect, must have been smaller than the average size of those now existing on our shores.

7. DONAX. Fragments of a species of this genus seem to be next, in point of frequency, to those of the ARCÆ, and few were obtained nearly entire; as far as I could judge, by comparison, the species is the same with the D. *variabilis*, nobis. Some of the fragments have not yet altogether lost the fine purplish colour of the inner side of the shell.

8. CREPIDULA. A single specimen, too imperfect to admit of a specific decision.

9. LUCINA. A single, young, and imperfect specimen.

10. ARCA. Besides the species of Arca above enumerated, there are some fragments of another species, probably now extinct upon our coast, or, if still existing, extremely rare. It is possible this may prove to be the A. *candida*, GMEL. as it has intermediate smaller striæ towards the anterior end.

Fragments of several other shells were obtained from the mass, but they were too imperfect to justify even the hazard of a conjecture respecting their affinity. It will be observed that all the species here mentioned are bivalves, not the smallest determinable portion of a univalve was observed: from which circumstance we may conclude that the island is almost exclusively formed of bivalve shells, and chiefly of the genus ARCA.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

80

In a small mass in the possession of Dr. Hays, I observed a young indeterminable species of the genus NATICA, and two specimens of a small OLIVA, also too imperfect to be determined. A mass in the Philadelphia Museum contains a fragment of NASSA *trivittata*, nobis.

An account of some of the FOSSIL SHELLS *of Maryland. By* THOMAS SAY. *Read July* 20, 1824.

The following descriptions were made out from specimens in a very large and fine collection of fossil shells which Mr. John Finch obtained with much labour and some expense in Maryland, and which that gentleman with great liberality submitted to my examination. Many of these shells appear to the eye nearly as perfect, in every respect, with the exception of colour, as the recent ones of the coast, and not a few of the bivalves have both valves attached together by the teeth of the hinge; circumstances which indicate an undisturbed deposition from the waters in which they had lived. Respecting the limits which circumscribe this body of shells, the relative situation in which the species are found, &c. we may expect much interesting information from Mr. Finch. I may, however, observe at present, that it seems probable that the formation extends much farther south than might at first be supposed, or that nearly a contemporary one exists in South Carolina. For a knowledge of this fact, I am indebted to Mr. Stephen Elliott, who sent me several shells from near the Santee river, one of which corresponds perfectly with a species in the collection of Mr. Finch.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

TURRITELLA.

T. *plebeia*. Pl. vii. fig. 1. Whorls convex, hardly flattened in the middle, with about twelve revolving elevated striæ, the middle ones alternately somewhat smaller; transverse wrinkles distinct.

This shell seems to attain to the length of rather more than one inch. Several specimens are imbedded in a small mass of light lead coloured clay. It somewhat resembles T. *brevis* of Sowerby, but the striæ are not crenulated. A species of TURRITELLA was found by Mr. A. Jessup in New Jersey, quite different from the present species, and resembling the T. *conoida*, Sowerby, but much smaller.

NATICA.

N. *interna*. Pl. vii. fig. 2. Subglobose, depressed, subglabrous; umbilicus open, with a revolving rib.

DESCRIPTION. *Shell* destitute of revolving striæ, and the wrinkles are not prominent, except near the suture, towards the labrum, and on the verge of the umbilicus: *spire* but little prominent, acute: *aperture* subovate: *umbilicus* open, permitting a view nearly to the inner tip of the spire; a revolving rib above the middle of each volution, terminating at the labrum in a hardly prominent callus.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length seventeen-twentieths, breadth nine-tenths of an inch.

Several specimens are in Mr. Finch's collection in tolerable preservation, but very fragile, though not thin. I obtained a species of NATICA at Mullica Hill, New Jersey, a few years since; but it is so changed by casualties, and by the infiltration of ferruginous matter, that its specific alliance with the present species cannot be appreciated.

OLIVA.

Several specimens occur about the length of one inch and two-fifths, but too imperfect to admit of any decision as to the species.

BUCCINUM.

1. B. *porcinum*. Pl. vii. fig. 3. Subovate, acute, slightly undulated, and spirally striated; labrum toothed.

DESCRIPTION. *Shell* with numerous, subequal, slight undulations, disappearing on the body whorl, and about seventeen transverse, little elevated striæ: *whorls* nearly six, but little convex: *suture* very narrow, consisting of a mere indented line: *apex* acute: *aperture* moderate, rather more than half the length of the shell: *labium* covering the columella, concave: *labrum* not thickened; on the inner submargin with striæform teeth.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length one inch and a quarter, breadth rather more than three-fourths of an inch.

This is shorter than the *reticosum* of Sowerby, the suture is not so deeply impressed, the undulations are not so obvious, and the concavity of the labium is much more profound.

2. B. *aratum*. Pl. vii. fig. 4. Oblong subovate, spirally striated; labrum thickened and toothed within.

DESCRIPTION. *Shell* with more than twenty revolving, slightly elevated lines: *whorls* but little convex: *suture* very narrow, consisting of a mere indented line: *aperture* moderate: *labium* covering the columella, which is concave: *labrum* thickened on the exterior, and with striæform teeth on the interior submargin.

Breadth half an inch, length of the aperture rather less.

Smaller and of a much more slender form than the preceding, and altogether destitute of undulations. The summit of the spire being deficient in the specimen, its length cannot be ascertained.

FUSUS.

F. 4-*costatus*. Pl. vii. fig. 5. Ovate-ventricose; with a dilated umbilicus, and four much elevated belts, which are more dilated at their tops.

DESCRIPTION. *Spire* short, the volutions with but two belts, the others being concealed by the succeeding whorls: *body whorl* with four belts, which are equidistant, much elevated, wider at top than at the junction with the whorl, and with one or two deeply impressed lines; intervening spaces wrinkled, the wrinkles extending over the belts: *aperture* suboval: *canal* short and contracted: *labrum* with a groove corresponding with each of the exterior ribs: *umbilicus* dilated, large, not visibly penetrating to the inner summit; the exterior margin prominent and deeply dentated.

Varies much in size; the smallest in Mr. Finch's collection is about three-fifths of an inch wide, another is rather more than one inch in width, and the largest is nearly three inches and three-fourths; but a fragment of a still larger one leads me to believe that the species attained to a width of more than four inches. I am unable to state the proportional length, all the specimens having truncated spires. The belts of some young specimens are altogether destitute of the impressed lines.

It seems hardly possible that Lister's figure 2, of plate 1059, was intended for this shell, although it has certainly a general similarity in the ribbed appearance of the figure, and notwithstanding the locality "*a Marylandia*," which is engraved with it, inasmuch as there is not any appearance whatever of an umbilicus, which is so much dilated and so remarkable in the species under consideration.

Lister's figure is quoted by several authors amongst the synonymes of BUCCINUM *scala*, and considered as a variety of that shell, which may perhaps be correct; but in that case the fact of such a shell having been found in Maryland, is at least doubtful. Our shell may be the same with the species which Dillwyn informs us is mentioned in the Portland Catalogue, lot 3516.

A fine specimen of this shell was sent me some time since by Mr. Stephen Elliott of Charleston, who informed me that it was found with other interesting and perfect shells which accompanied it, on the Santee river, a little below the junction of the Congaree and Wateree rivers.

FUSUS *cinereus* nobis. A variety of this shell is in Mr. Finch's collection; it differs but little from the recent shells, the spire and beak are slightly longer.

FULGUR.

1. F. *canaliculatus*, Linn.

Lister Conch. pl. 878, f. 2.

Ellis' Coral. pl. 33, f. b. As this latter figure has the channel of the spire, and is accompanied by the ovaries of the *canaliculatus*, it is, no doubt, the young of this shell, reversed by an error of the engraver as Dillwyn has already supposed.

VARIETY. Sutural channel dilated, columella much arcuated.

With the exception of the variation above mentioned, the specimen agrees very well with the species to which I have referred it. The granulations which crown the spire of the young shell are very evident in this specimen. These elevations characterize the MUREX *granum*, Schrœter, which Linné considered to be the young of this species.

2. F. *carica*, Gmel.

Lister, Conch. pl. 880.

F. *eliceans*, Montf. p. 152. Knorr delic. pl. 30. f. 1.

There can be no doubt of the identity of a specimen collected by Mr. Finch, with this species.

The *carica* varies considerably in the magnitude and number of the elevations which constitute the armature of the shoulder. In the young shell they are more numerous than in the adult, and the beak is proportionally longer and more slender. A variety in this fossil collection has the elevations of the shoulder hardly prominent.

CALYPTRÆA.

1. C. *grandis*. Pl. vii. fig. 6. a. Internal view. b. Lateral view. Ovate; internal appendage dilated, and attached to the side of the shell.

DESCRIPTION. *Shell* large, ovate at base, inequilateral, concentrically wrinkled, destitute of spines or processes: *apex* behind the middle nearly erect: *internal appendage* transverse, patulous, occupying a considerable portion of the cavity of the shell, and attached by one side, from its summit to its edge, to the shorter side of the shell; its summit corresponding to the inner apex of the shell.

This very remarkable shell is perfectly distinct as a species from any other yet known. That it does not, in rigid accuracy, belong to the genus CALYPTRÆA, must be evident to every conchologist who considers the characters laid down in the above description, and who is, at the same time, aware, that the internal appendage of the type of the genus, is open on one side throughout the whole of its length. If it be not properly a CALYPTRÆA, it cannot be referred to the closely related genera INFUNDIBULUM, Montf. and MITRULA of Gray, much less to any other genus with which we are acquainted. I therefore propose that it be placed in a new genus under the following name and characters.

DISPOTÆA.

Shell univalve, conoidal, patelliform, with an internal entire cup-shaped appendage, adhering by its side and apex to the side of the shell.

To this genus will also be referred a recent species brought by Lieut. Gantt, U. S. N. from South America, and presented by him to the Academy. Of this shell I cannot find any description, and will therefore characterize it as follows:

D. *tubifera*. *Shell* oval, inequilateral, with small radiating striæ, and numerous tubular processes: *apex* inclinde towards the shorter side; within livid-brown, polished: *cup-shaped appendage* brown near the apex, margin pure white, and distinct from the side as far as the submargin.

CALYPTRÆE *costata*, nobis, Silliman's Journal, vol. 2, p. 40, belongs to this genus. In Mr. Finch's collection are fine specimens of this species.

FISSURELLA.

F. *redimicula.*—Pl. viii. fig. 1. Ovate-oval a little oblong, conic-convex, with approximate longitudinal striæ; foramen ovate-oval, inclined.

DESCRIPTION. Longitudinal striæ slender, numerous, granulated, approximate; the granulations of the striæ give the appearance of concentric obsolete lines: *aperture*, inner margin crenate; thickened inner margin of the foramen truncate at one end.

Longest diameter one inch and a half.

I am not acquainted with the F. *peruviana*, Lam. and the description of that shell will not enable me to judge satisfactorily of its degree of affinity with the present species.

OSTREA.

1. O. *compressirostra.* Pl. viii. fig. 2. a. Internal view. b. External view. *Shell* sinistral,

subovate : *inferior valve* convex, with numerous convex ribs interrupted by fornicated scales at the lines of increment ; *hinge* curving a little upward, very much contracted and short : *superior valve* flat, wrinkled concentrically, without any appearance of longitudinal lines : *hinge* more dilated than that of the superior valve, and oblique with respect to the thickness of the shell.

Length of the specimen four inches and four-fifths ; breadth four inches and a quarter. A large superior valve is five inches and three quarters long, and five inches and a quarter broad.

Like many species of this genus, it varies much in form, and in the prominence of the ribs on its convex valve ; but these ribs are very obvious on the nine specimens under examination. Externally some varieties have a striking resemblance to O. *bellovacina*, Lam. but the hinge is much more contracted.

Besides those obtained by Mr. Finch, Mr. Z. Collins presented a fine specimen to the Academy, found on the west branch of the Potomac, about fifteen miles below Alexandria.

PECTEN.

P. *Jeffersonius*. Pl. ix. fig. 1. Subequivalve, with from nine to eleven striated ribs.

DESCRIPTION. *Shell* rounded, convex, not quite equivalved, one of the valves being a little more convex than the other ; the whole surface covered with approximate, scaly striæ : *ribs* elevated, rounded, with six or seven striæ on the back of each ; intervening grooves profound : *ears* equal : sinus of the ear of the superior valve, not profound, being barely one eighth part of the length of the ear : *within* with broad rounded flattened ribs.

Length five inches and three-tenths, breadth five inches and seven-tenths.

Specimens of this truly fine shell are not uncommon. The Academy has been long in possession of several single valves, in an excellent state of preservation, obtained by my friend Mr. J. Gilliams, and others which were presented by Mr. Watson, who purchased them at the sale of the collection of the late Professor Barton. Mr. Finch has succeeded in obtaining entire specimens of the two valves of the same individual. I am of the opinion that Lister's plate 167, is intended to represent this shell, and that the singular appearance of the marginal striæ in that figure is a deviation from the ordinary formation of the species, and is owing to the dislocation of the lines of increment, and obliteration of the longitudinal striæ. Lister describes his specimens to be of a "blue-clay colour," in this respect perfectly corresponding with two specimens before me.

On one of the specimens is an imperfect ASTREA.

2. P. *Madisonius*. Much compressed, with about sixteen striated ribs.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

DESCRIPTION. *Shell* rounded, much compressed; the whole surface covered with scaly striæ: *ribs* elevated, rounded, with about three striæ on the back of each; intervening grooves rather profound: *ears* equal, sinus of the ear of the superior valve profound, extending at least one third of the length of the ear.

Length rather more than four inches and a half; breadth four inches and four-fifths.

In magnitude this shell is justly entitled to compare with the preceding; but it differs in being much less convex, and in having a much more profound sinus in the ear of the superior valve. Three specimens, from which the above description was taken, belong to the Academy, and were presented by Mr. Watson.

3. P. *Clintonius*.* Pl. ix. fig. 2. Auricles equal; surface with from one hundred and forty to one hundred and eighty elevated longitudinal lines.

DESCRIPTION. *Shell* suborbicular, compressed, with very numerous, regular, elevated striæ, which are muricated with minute scale formed by transverse wrinkles, that are sparse in the middle of the length, and crowded each side of the shell; the intervening spaces are regularly concave, and in parts very distinctly wrinkled: *auricles* equal, striated like the general surface: *within* simple, margin striated.

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* Mr. Finch requested that three species of his collection that might prove to be new, should be dedicated to the distinguished men whose names these shells bear.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length four inches; breadth rather more.

This is a very fine shell, comparable with the *magellanica;* but the sides below the auricles decline much more rapidly towards the base, and the striæ, judging from Bruguiere's figure, are much more prominent and distinct.

4. P. *septenarius.* Pl. ix. fig. 3. *Shell* convex, suborbicular: *auricles* subequal: *surface* with numerous slightly scaly striæ, and about seven remote ribs, of which the three intermediate ones are much elevated, rounded, or slightly flattened on the top.

Length nearly two inches and seven-tenths.

But a single imperfect, inferior valve, occurs in Mr. Finch's collection; but this is so perfectly distinct from any other that I have seen described, that I have no hesitation to describe it as new. The striæ are equally distinct on the ribs, and in the intermediate spaces. The scales are rather thick, very small, and not confined to the striæ, but are also observable in the spaces between the striæ.

PLICATULA.

P. *marginata.* Pl. ix. fig. 4. a. External view. b. Internal view. Shell ovate-cuneiform, somewhat arcuated at base; with about three much elevated folds, producing very profound undulations on the edge of the shell; the intermediate fold is bifid; the whole surface is marked by rather gross concentric wrinkles; inner margin dusky or blackish, with a series of granules on one valve, received into corresponding cavities in the opposite valve.

Length one inch and a fifth, breadth one inch.

This species is very distinct from the P. *plicata*, Linn. of the West Indies, and from that of the East Indies, hitherto confounded with the *plicata*, but to which Lamark's name of *gibbosa* may be transferred.

Of the known fossil species, it seems to approach nearest to the *angulata*, Lam. but the folds are neither squamous nor angulated.

ARCA.

1. A. *arata*. Pl. x. fig. 1. Shell transversely oblong, subrhomboidal, with about twenty-six longitudinal ribs; basal edge nearly parallel to the hinge margin, which latter terminates anteriorly in an angle.

DESCRIPTION. *Ribs* somewhat flattened, as wide or rather wider than the intervening spaces; the whole surface concentrically wrinkled: *umbones* not remarkably prominent: *apices* remote, the intervening space rhomboidal, with continued indented lines, arcuated under the apices: *hinge* *margin* perfectly rectilinear, angulated at the extremities, the anterior one a little projecting : *teeth* in a continued, uninterrupted line, parallel, excepting at the two extremities of the line, which decline a little, and the teeth are there decidedly longer and oblique with respect to the others of the range : *posterior end* obliquely rounded to the base : *base* nearly rectilinear and parallel to the hinge margin, and deeply crenated on the inner margin : *anterior end* produced below the middle, and rounded, and a little contracted near the superior angle.

Length from the hinge margin to the base one inch and three-tenths, breadth two inches and a half.

This resembles a species found recent and very common in the West Indies, and which I have not ascertained to be distinctly described. That shell, however, is proportionally longer, the anterior extremity only of the line of teeth declines a little, and the series is slightly dislocated a little before the apices of the shell.

2. A. *centenaria*. Pl. x. fig. 2. Shell transversely-oval, subrhomboidal, obtusely contracted at base, with numerous alternate longitudinal striæ.

DESCRIPTION. Striæ from one hundred to one hundred and eighty and more in number : disappearing on the hinge margin ; with hardly obvious transverse minute wrinkles, and larger, remote, irregular ones of increment : *beaks* but little prominent, not remote: base widely but not deeply contracted, nearly parallel with the hinge margin: *anterior* and *posterior margins* obtusely rounded: *series of teeth* rectilinear, uninterrupted, decurved at the tips; space between the beaks with numerous grooves proceeding from the teeth: *inner margin* not very distinctly crenated: *muscular impressions* elevated, and forming a broad line each side, from the cavity of the beak to the margin.

Length nine-tenths of an inch, breadth nearly one inch and a half.

3. A. *incile*. Pl. x. fig. 3. Shell transversely rhomboidal, with about twenty-seven ribs; anterior hinge margin compressed and angulated.

DESCRIPTION. *Disk* prominent from the beaks to the anterior part of the base: *ribs* with transverse granules; those anterior to the middle alternating with very slender and but little prominent lines, and with a groove on each: *anterior margin* longer to the base than the posterior end, and contracted in the middle: *series of teeth* nearly rectilinear, entire; interval between the teeth and the apices with a few transverse lines or wrinkles; a single oblique groove from the apex to a little before the middle, and six or seven narrow ones from the teeth outwards behind the apices: *beaks* placed very far backward: *inner margin* crenated: *muscular impressions* a little elevated, posterior one short: *basal margin* not parallel with the hinge margin.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length nearly seven-tenths of an inch, breadth less than one inch and a fifth.

PECTUNCULUS.

P. *subovatus.* Pl. x. fig. 4. Longitudinally short ovate, with about thirty longitudinal impressed acute lines, the intervals a little convex.

DESCRIPTION. *Shell* increasing in width by a slightly curved line from the apex to beyond the middle: *lateral curvatures* equal: *apices* separate, small, central; intervening space with but little obliquity to the plane of the shell, with obsolete angulated lines: *teeth* forming a regularly and much arcuated series, which is rectilinearly truncated above so as to leave in that part a mere edentulous elevated line: *within* destitute of striæ: *margin* with elevated angular lines: *exterior surface* with about thirty longitudinal, impressed, acute lines, the intervals a little convex.

Length from the apex to the base one inch and thirteen-twentieths, breadth one inch and a half nearly.

The character of the interval between the beaks is not unlike that of a CUCULLÆA, but the arrangement of the teeth does not correspond with the definition of that genus.

This shell varies a little in form, being sometimes nearly orbicular.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

NUCULA.

1. N. *lævis*. Pl. x. fig. 5. Transversely elongate-subovate, rostrated, nearly smooth.

DESCRIPTION. *Shell* compressed, thin, fragile, polished, smooth, slightly wrinkled towards the base: *beaks* nearly central, hardly prominent beyond the hinge margin, rounded, approximate: *series of teeth* subrectilinear, a little arcuated behind; teeth prominent: *hinge margin* exteriorly both before and behind the beaks rather abruptly compressed: *posterior margin* rounded: *anterior margin* somewhat rostrated, the anterior hinge margin rectilinear, very little reflected at tip: *inner margin* simple.

Length nearly half an inch, breadth nearly one inch.

This shell may be compared with the N. *pellucida*, Gmel. but it is shorter, in proportion to its width, and the beaks are nearer the centre. It is still more closely allied to a recent species of our coast, that has probably been hitherto considered as the *rostrata*.

2. N. *concentrica*. Pl. x. fig. 6. Transversely elongate-subovate, rostrated, concentrically striated.

DESCRIPTION. *Shell* convex: *rostrum* considerably narrowed towards the tip: *surface* concentrically striated with numerous, regular, equidistant, rounded lines: *beaks* rather behind the middle: *ligament margin* a little concave: *series of teeth* angulated at the beaks.

Length over one-fifth, breadth two-fifths of an inch.

The regularly striated surface gives this shell a very pretty appearance. In outline it has some resemblance to the *rostrata*.

VENERICARDIA.

V. *granulata*. Pl. xii. fig. 1. Suborbicular, with about twenty-five convex ribs, and wrinkled across; inner margin crenate.

DESCRIPTION. *Beaks* nearly central, a little prominent, curved backward: *ribs* granulated on the umbones, and transversely wrinkled near the base, convex: *apices* somewhat prominent beyond the general curve of the shell: *inner margin* and *edge* crenate: *cardinal* teeth two.

Length from the apex to the base four-fifths of an inch, breadth nearly the same.

Rather proportionally longer than the *decussata*, and more oblique.

CRASSATELLA.

C. *undulata*. Pl. xi. fig. 2. a. External view. b. Internal view. Much compressed, transversely oblong-subovate, slightly angulated before; surface rather coarsely wrinkled, and on the umbo with small, regular undulations ; umbo flattened : *apex* subacute, not prominent, placed a little behind the middle of the shell : *hinge* teeth distinct, prominent : *fosset* much dilated ; a profound groove on the anterior inner margin : *edge* not crenated ; on the exterior anterior margin and submargin are two undulations, of which the former is less distinct and more acute.

Width rather less than one inch and nine-tenths to four inches and three-fifths, length less than one inch and three-tenths to about three inches.

The species to which this is most closely allied, is the *compressa*, Lam. Its compressed form, and the somewhat elevated lines on the anterior part of the shell, seem to be very similar ; but that species is proportionally much broader behind, the beaks are much nearer the posterior extremity, and the inner edge is crenated. A perfect valve was purchased at the sale of the late Professor Barton's collection by Mr. Watson, and by him presented to the Academy. Its locality was not known, but a fragment which I dissected out of a mass containing fragments of PERNA, belonging to the collection of Mr. Finch, has decided this question.

ISOCARDIA.

I. *fraterna*. Pl. xi. fig. 1. a. Hinge 2. b. Back view. Cordate-globose, slightly oblique, with rather large concentric wrinkles, and lines of growth ; an elevated undulation on the anterior submargin, marking the greatest length of the shell : *umbones* not very prominent, apex rather suddenly incurved, acute ; impressed space behind the beaks, dilated and rather profound ; anterior tooth striated externally, and placed on the middle of the anterior margin.

Large specimen, greatest length taken obliquely, three inches and a half, breadth rather less.

Small specimen, greatest length rather over one inch and a half, breadth nearly one inch and four-fifths.

This shell is so much like the VENUS *rustica*, Sowerby, that I hesitated to give it a distinct name. Besides being somewhat less transverse, it may be remarked that the hinge groove, behind the primary tooth, is much more elongated ; but notwithstanding these differences, such is the general correspondence of the two shells, that I should not be surprised if this should prove to be only a variety of the *rustica*.

A large specimen which formerly belonged to the collection of the late Professor B. S. Barton, was presented to the Academy by Mr. Watson. A smaller one was obtained by carefully dissecting one of the friable masses containing fragments of the Perna, in Mr. Finch's collection.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

TELLINA.

T. *æquistriata*. Pl. x. fig. 7. *Shell* transversely ovate-orbicular, with an elevated line or fold on the anterior margin : *surface* with fine, somewhat elevated, concentric, nearly equal, numerous striæ, forming grooves between them : *apex* nearly central, acute : *cardinal teeth* deeply grooved : *lateral teeth* two ; edge within, simple.

Length seven-tenths, breadth nineteen-twentieths of an inch.

In general outline, this species has a resemblance to T. *ostracea*, Lam. In one specimen the apex is central, and in another it is placed before the middle.

LUCINA.

1. L. *contracta*. Pl. x. fig. 8. *Shell* convex, suborbicular, with numerous concentric, regular, equidistant, elevated, membranaceous striæ, and intermediate smaller transverse lines : *umbones* not very prominent : *apices* proximate, nearly central : *anterior hinge margin* rectilinear, to an obtuse angle near the middle of the anterior margin : *anterior submargin* with a very slightly impressed line : *posterior margin* rounded : *cardinal teeth* one in the left valve, and two in the right, the posterior one of which is subbifid at tip : *lateral*

teeth none : *within* obsoletely striated towards the margin : *posterior muscular impression* perfectly rectilinear, elongated, and oblique.

Length one inch and nine-tenths, breadth two inches and one-tenth.

The posterior muscular impression is even more elongated and slender than that of L. *jamaicensis*, Chemn. In outline it is like L. *scabra*, Lam. The impressions both before and behind the beaks are very slender and contracted. A young specimen belonging to the Academy, was brought from Maryland by Mr. Jacob Gilliams.

2. L. *anodonta*. Pl. x. fig. 9. Orbicular, slightly transverse, compressed ; teeth obsolete.

DESCRIPTION. *Shell* with elevated wrinkles ; orbicular, a little transverse, with a very slight impressed longitudinal line on the anterior margin : *anterior* and *posterior ends* equally curved : *apices* not prominent beyond the general curve of the shell, with a very short deep emargination behind them ; *teeth* obsolete ; both the cardinal and lateral ones are generally altogether wanting : *lunule* short, cordate, profound.

Length from the apices to the base one inch and one-tenth, breadth one inch and one-fifth.

The impressed line on the anterior part of the shell is hardly visible in many specimens, and is sometimes only a very slight undulation, not observable but on close inspection. In the specimens, the ligament of the hinge still remains, apparently but little changed; by pressure of the nail it is readily separated into flaxy filaments.

3. L. *subobliqua.* Orbicular, slightly oblique, a little compressed; teeth prominent; lunule not distinct.

DESCRIPTION. Shell concentrically wrinkled; a little oblique forwards, the most prominent part of the basal curvature being anterior to the middle; no appearance of an impressed line on the margins, which are rounded, the hinge margin being rectilinear for a short distance: *lunule* none, or consisting only of a slightly impressed line: *beaks* slightly prominent: *muscular impressions* dilated, submarginal: *cardinal teeth* prominent, the larger one with a groove: *lateral teeth* none.

Length four-fifths of an inch, breadth nearly the same.

4. L. *cribraria.* Pl. xiii. fig. 1. Orbicular, convex, with numerous longitudinal costæ, and distinct elevated concentric lines.

DESCRIPTION. *Shell* with close set, longitudinal, equal, granulated ribs, and more or less elevated, distinct, concentric lamellæ: *hinge margin* obtusely and not prominently angulated at its anterior and posterior terminations: *anterior margin* with a dilated slightly impressed, and not very obvious groove: *lunule* oblong-oval, very distinct, the edge near the beaks extending inwards beside the primary teeth: *lateral teeth* very distinct, the posterior one placed nearly under the middle of the lunule : *within* crenate on the edge : *posterior muscular impression* rectilinear.

Length half an inch, breadth eleven-twentieths of an inch.

Two or three smaller specimens are two-fifths of an inch long. In the outline of the edge, and number of the costæ, this species approaches the L. *scabra* of authors ; but it is more convex, and in other respects sufficiently distinct. In the larger specimens, the transverse lamellæ are almost obsolete at base, and the ribs prevail in that part.

L. *divaricata*. Var. The fossil specimens of Maryland are altogether similar to those found at present in a recent state on our southern coast. This variety is smaller than those of South America and the West Indies, and the lateral teeth are more obvious. In the collection of the Academy is a large specimen of the *divaricata* from the West Indies, that agrees with the description of the *dentata* of Wood. I should therefore be inclined to suppose, that the *dentata* is no other than a variety of the former, owing to age.

VENUS.

1. V. *deformis*. Pl. xii. fig. 2. a. View of the hinge. Shell remarkably thick and ponderous, longitudinally undulated ; basal margin undulated.

DESCRIPTION. *Shell* subcordate, with transverse wrinkles, which are distant and regular on the umbones, and much crowded on the basal half; several very obtuse longitudinal undulations, of which that on the middle is more profound: *basal margin* deeply undulated in compliance with the undulations of the disk: *within* crenate on the edge: *anterior margin* flattened, and simply wrinkled.

Length nearly five, breadth six inches.

Smallest specimen, three inches and seven-tenths long, and four inches and a half wide.

This extraordinary shell has so unusual an appearance, that I should almost have been disposed to regard a single specimen as a monstrosity. The examination of several individuals proves that the species varies somewhat in form, and in the locality of the undulations.

2. V. *paphia?* Lam.

CYTHEREA.

C. *convexa*. Pl. xii. fig. 3. *Shell* subcordate; elevated convex, concentrically wrinkled, inequilateral; posterior tooth and fosset not striated; edge not crenated; umbo rather prominent; lunule dilated, cordate, marked by a simple line.

Length one inch and a tenth, breadth more than one inch and three-tenths.

On the inner surface of the shell is a prominent line in one valve, proceeding from the extremity of the impression of the retractor muscle, and becoming obsolete behind the cavity of the umbo; on the opposite valve is an impressed line, occupying a similar position. Whether or not this line is characteristic, I am unable to determine, having seen but two valves.

C. *concentrica*. Born. Mr. Finch's differ from those now existing on our southern coast, in being larger.

Length three inches and three-tenths, breadth three inches and two-fifths.

ASTARTE, *Sowerby*.

1. A. *undulata*. Pl. ix. fig. 5. Shell trigonate, umbones flattened, and with profound undulations; apices very acute.

DESCRIPTION. Basal half of the shell coarsely wrinkled, the remaining half deeply, regularly and widely undulated on the flattened umbo: *lunule* large oblong subovate, concave, separated from the disk, particularly near the beaks, by an acute angle: *beaks* prominent, approximate, acute, turned a little backward at tip: *ligament margin* concave nearly to the basal angle, and separated from the disk, near the beaks, by an acute angle: *ligament* very short: *teeth* regularly crenated each side: *basal angles* rounded: *basal edge* nearly rectilinear, or very obtusely arcuated; within finely crenated; smaller muscular impression very distinct.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length four-fifths, breadth rather less than nine-tenths of an inch.

Var. a. Length one inch and a tenth, breadth one inch.

A very distinct species, unlike any other yet described. It varies in proportional length, some being longer than broad, and others broader than long. I adopt Sowerby's generic name, in preference to that of CRASSINA of Lamarck, for the all-sufficient reason, that it has the priority. The recent shell which I described under the name of VENUS *castanea*, Journ. Acad. Nat. Sc. vol. 2. p. 273, belongs in strictness to this genus.

2. A. *vicina*. Pl. ix. fig. 6. Trigonal with a distant, somewhat regular, impressed line: lunule much excavated; apices acute.

DESCRIPTION. *Apices* prominent: *lunule* dilated, deeply excavated, subcordate, separated from the disk, particularly near the beaks, by a subacute angle: *beaks* prominent, approximate, acute, curved backwards: *ligament margin* concave: *umbones* convex.

Length nine-tenths of an inch, breadth one inch.

Closely allied to the preceding, but numerous specimens correspond in the much more profoundly concave lunule, and in the convexity of the umbones.

MACTRA.

Two or three mutilated specimens of a species closely allied to M. *lateralis*, nobis, but too imperfect to determine the degree of proximity.

AMPHIDESMA.

A. *subovata*. Pl. x. fig. 10. Shell transversely ovate-oval, with somewhat prominent and regular concentric striæ.

DESCRIPTION. *Shell* compressed : *beaks* rather before the middle, but little prominent : *anterior* submargin with an obsolete, obtuse undulation : *lunule* lanceolate : *cardinal* and *lateral teeth* prominent.

Length seven-tenths of an inch, breadth less than one inch.

CORBULA.

1. C. *cuneata*. Pl. xiii. fig. 2. *Shell* transversely ovate-trigonal, acutely angulated or somewhat rostrated before, and depressed on the anterior slope, which is separated from the disk by a subacute line : *surface* of both valves similarly striate with equal, elevated, equidistant lines, forming grooves between them ; the striæ on the smaller valve are rather more distant : *umbones* not prominent.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

Length of the larger valve hardly more than the fourth of an inch, breadth more than two-fifths of an inch.

A very pretty species. It was imbedded in a mass which contained fragments of the large PERNA.

2. C. *inæquale.* Pl. xiii. fig. 3. Shell convex, transversely ovate-trigonal, rough, with unequal coarse wrinkles : *anterior margin* with a very acute but short rostrum at its inferior termination, separated from the disk by an acute line : *base* rounded and a little contracted near the anterior angle : *umbones* not prominent.

Length two-fifths, breadth rather more than half an inch.

This species has a different aspect from the preceding ; it is longer in proportion to its width, more convex, and the wrinkles, though prominent, are altogether destitute of that equality which distinguishes those of the other shell.

PANOPÆA, *Menard.*

P. *reflexa.* Pl. xiii. fig. 4. Exterior and interior views. *Shell* transversely oblong-subovate : *anterior margin* somewhat narrower and longer than the posterior margin, the edge reflected : *surface* wrinkled, and profoudly so towards the base.

Length three inches and two-fifths, breadth five inches and seven-tenths.

This fine shell approaches closely to the P. *fau-*

jas of Menard, which Lamarck seems inclined to consider as but a variety of the P. *glycimeris*, Gmel. Our shell is comparatively somewhat shorter than the latter, and its reflected anterior margin distinguishes it from the *faujas*.

SERPULA.

S. *granifera*. Pl. viii. fig. 4. Covered with longitudinal, contiguous, slightly elevated, granulated striæ.

DESCRIPTION. Shell subcylindric, contorted, inferior side flat ; the whole surface is composed of very numerous, small, contiguous striæ, each consisting of a single row of granules ; these series are alternately smaller.

Diameter of the larger end three-tenths, of the largest specimen two-fifths of an inch.

The continuity of the tube within, is interrupted by oblique diaphragms. It sometimes approaches the spiral form, and one specimen has three complete volutions of much regularity.

DENTALIUM.

D. *attenuatum*. Pl. viii. fig. 3. Arcuated ; surface marked with from twelve to sixteen rounded ribs, intervening grooves simple ; lines of growth numerous, distinct ; aperture orbicular.

Length nearly one inch and seven-tenths.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

The species of this genus are very closely allied to each other, and at the same time they exhibit so few characters, that it is with difficulty that some of them are determined. The present seems to differ from either of those already described. In the collection of the Academy are two fragments of DENTALIA very closely allied to this species, which were obtained by Mr. A. Jessup in New Jersey; but their imperfect state do not justify me in deciding upon a fact so important to geology as their specific identity.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1824.]

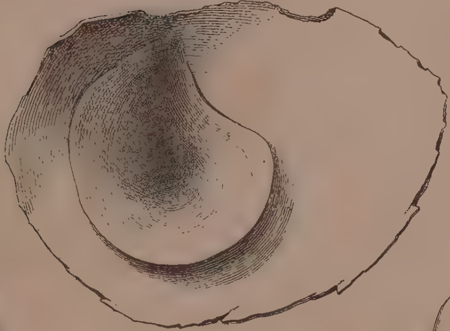
Plate VII.

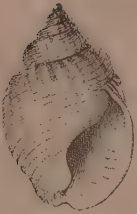
EXPLANATION OF PLATE VII.

(**26**)

		Page.
Fig. 1.	*Turritella plebeia*	125, **301.**
2.	*Natica interna*	“ “
3.	*Buccinum porcinum*	126, **302.**
4.	*Buccinum æratum*	127, **303.**
5.	*Fusus 4-costatus*	“ “
6.	*Calyptræa grandis* The type of the genus “*Dispotæa.*”	130, **306.**

Fig. 6. a





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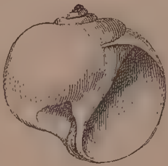

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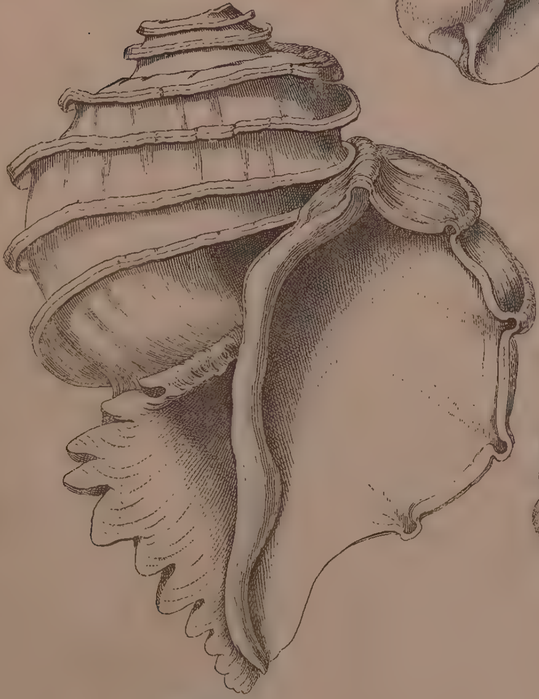

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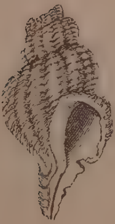

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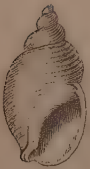

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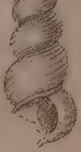

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Fig. 6. b

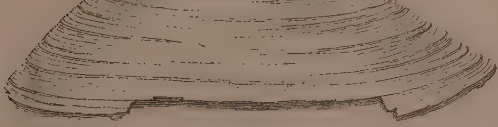
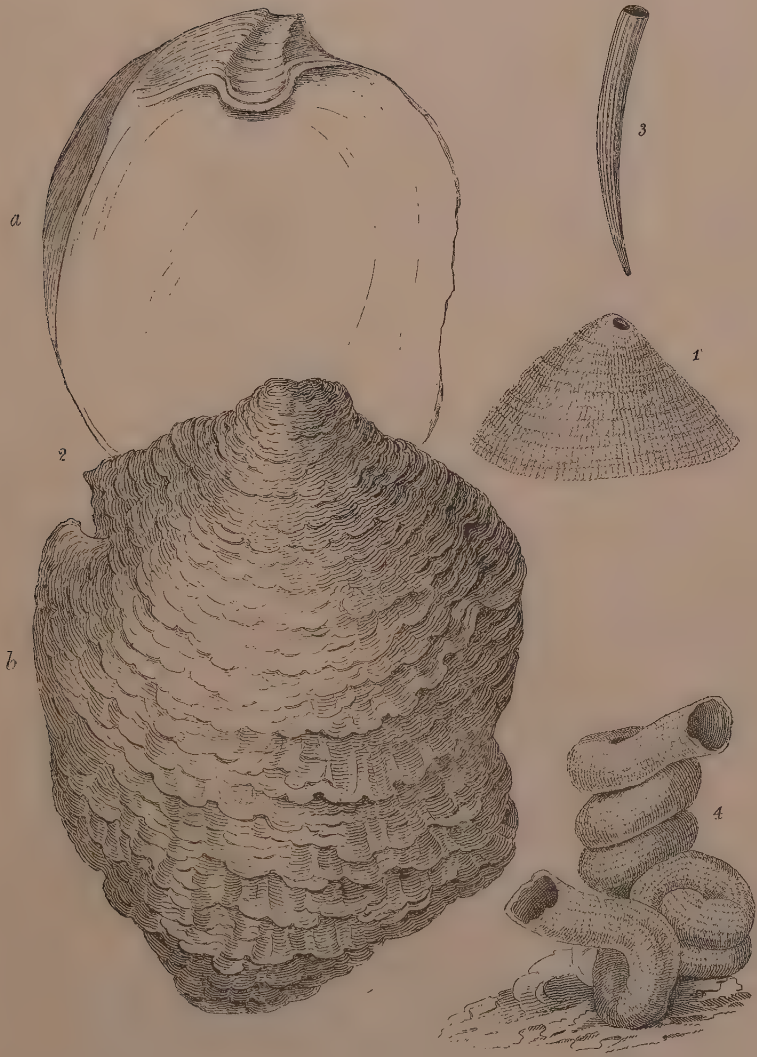


Plate VIII.

EXPLANATION OF PLATE VIII.

(**27**)

		Page.	
Fig. 1.	*Fissurella redimicula*	132,	**308.**
2.	*Ostrea compressirostra*	“	“
3.	*Dentalium attenuatum*	154,	**330.**
4.	*Serpula granifera*	“	“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a
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b
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Plate IX.

EXPLANATION OF PLATE IX.

(**28**)

		Page.
Fig. 1.	*Pecten jeffersonius*	133, **309.**
2.	*Pecten clintonius*	135, **311.**
3.	*Pecten septenarius*	136, **312.**
4.	*Plicatula marginata*	" "
5.	*Astarte undulata*	150, **326.**
6.	*Astarte vicina*	151, **327.**

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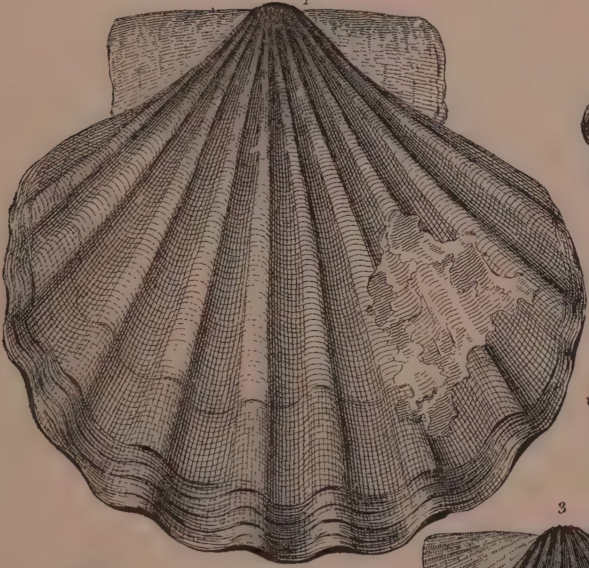

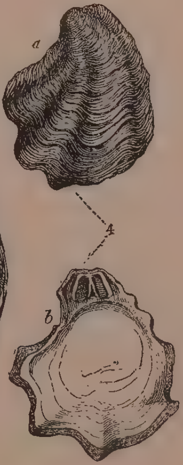

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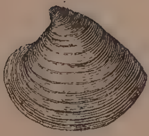

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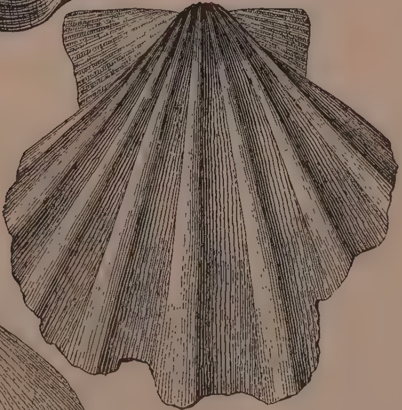

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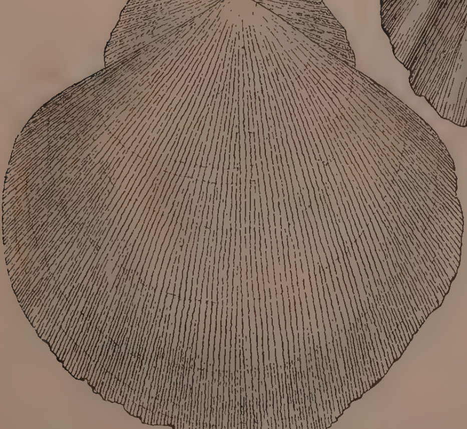

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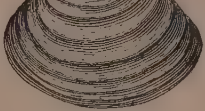

Plate X.

EXPLANATION OF PLATE X.

(**29**)

		Page.
Fig. 1.	*Arca arata*	137, **313.**
2.	*Arca centenaria*	138, **314.**
3.	*Arca incile*	139, **315.**
4.	*Pectunculus subovatus*	140, **316.**
5.	*Nucula lævis*	141, **317.**
6.	*Nucula concentrica*	" "
7.	*Tellina æquistriata*	145, **321.**
8.	*Lucina contracta*	" "
9.	*Lucina anodonta*	146, **322.**
10.	*Amphidesma subovata*	152, **328.**

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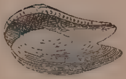

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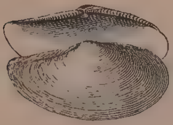

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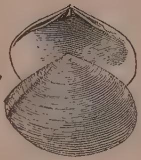

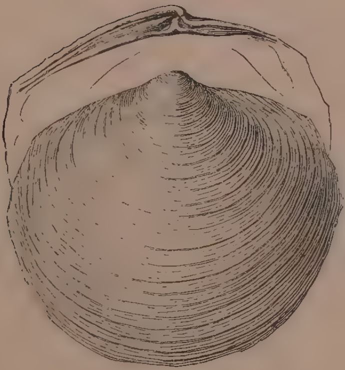

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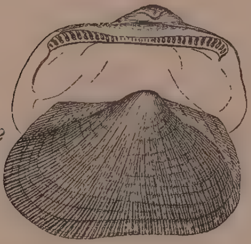

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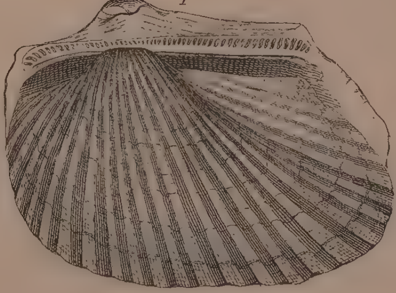

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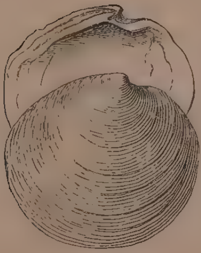

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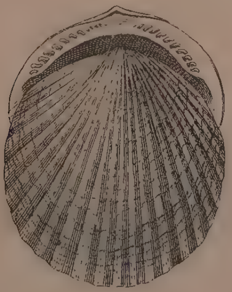

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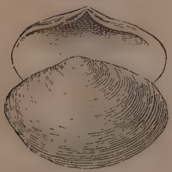

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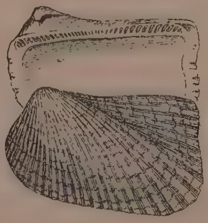
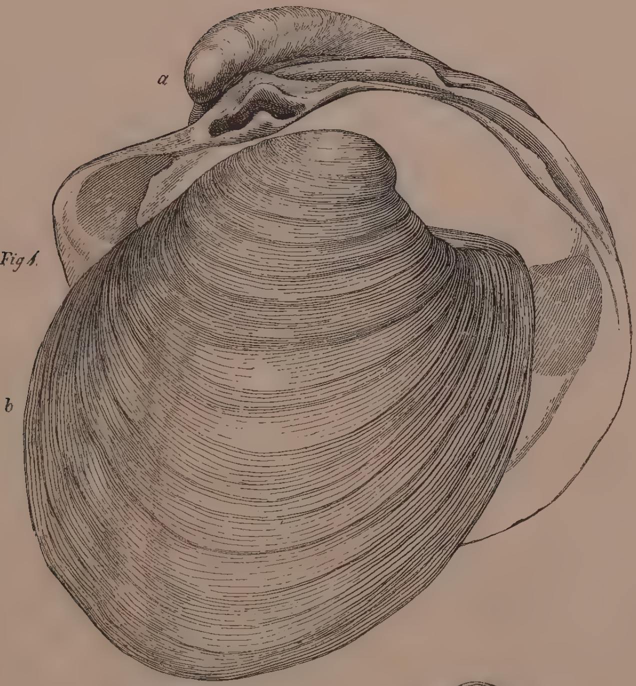


Plate XI.

EXPLANATION OF PLATE XI.

(30)

		Page.
Fig. 1.	*Isocardia fraterna*	143, **319.**
2.	*Crassatella undulata*	142, **318.**



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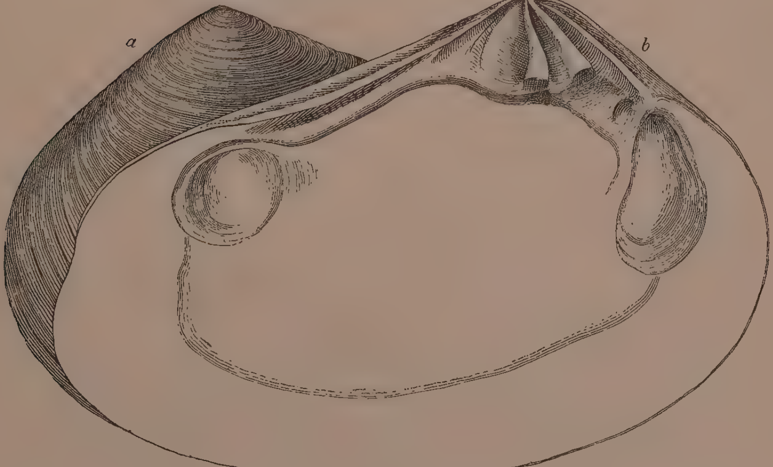


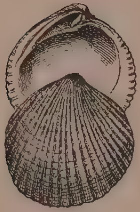
Fig 2.

Plate XII.

EXPLANATION OF PLATE XII.

(**31**)

		Page.
Fig. 1.	*Venericardia granulata*	142, **318.**
2.	*Venus deformis*	148, **324.**
3.	*Cytherea convexa*	149, **325.**



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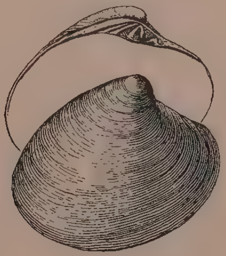

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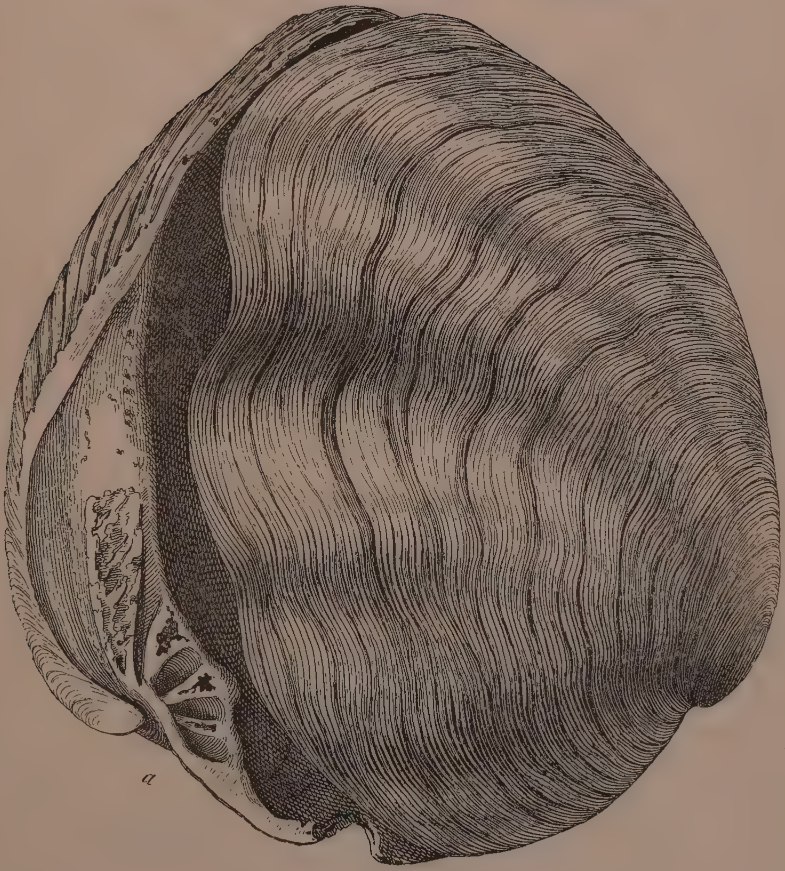

2

Plate XIII.

EXPLANATION OF PLATE XIII.

(**32**)

		Page.
Fig. 1.	*Lucina cribraria*	147, **323.**
2.	*Corbula cuneata* *	152, **328.**
3.	*Corbula inæquale*	153, **329.**
4.	*Panopæa reflexa*	" "

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* This and the following were numbered "3" in Say's original paper pp. 152 and 153.

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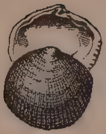

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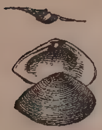

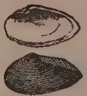

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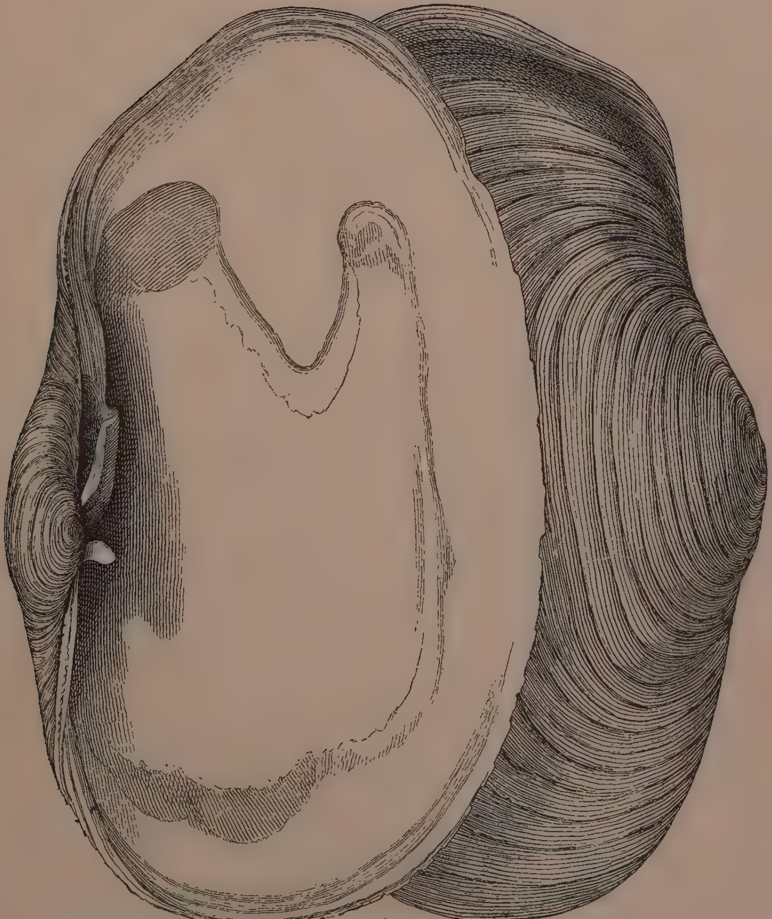

4

On two genera and several species of CRINOIDEA.

By THOMAS SAY. *Read March 1st*, 1825.

I am indebted to the politeness and liberality of Dr. J. Bigsby, for the opportunity of describing the very interesting animal remains which form the subject of the following new genus.

Family CRINOIDEA.

CARYOCRINITES.

Generic character. Column cylindrical, perforated by a tubular alimentary canal : *pelvis* formed of four plates ; costals six, supporting the scapulæ, from which the arms proceed.

In Miller's arrangement this genus will occupy a station in the division *Inarticulata*, between the genera CYATHOCRINITES & ACTINOCRINITES. It may be indicated by the following formula.

A. Pelvis of four plates.
A. Costal plates six.
a. Column not dilated.
o. Alimentary canal round.
§. Articulating surface of the columnar joints, radiated.
†. Auxiliary side arms cylindrical, and placed irregularly. *Genus* CARYOCRINITES.
1. Two of the costals hexagonal. *1st Sp. ornatus.*
2. One of the costals hexagonal. *2d Sp. loricatus.*

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1825.]

Species.

1. C. *ornatus.* Costals, four pentagonal and two hexagonal.

Column inserted into a cavity at the base of the pelvis: *pelvis* rather large; two of the plates quadrangular, attenuated to the base, where they are truncated and a little recurved at the junction with the column; disks, particularly towards the base, granulated, with a distinct elevated interrupted line; two remaining plates pentangular, attenuated to the base, where they are truncated and a little recurved at the junction with the column; disk with elevated granules, and with two elevated interrupted lines, extending to the terminal angles: *costals*, four pentagonal and two hexagonal, all with elevated interrupted lines, radiating from the centre to the angles, with a series of truncated granules on each side, and a few granules in the intervening spaces; interscapulars, two hexagonal, situated immediately above the hexagonal costals: *scapulars* six pentagonal, the upper sides of which are more or less irregular by projecting a little between the scapulæ, all with prominent lines granulated, similar to those of the preceding: *arms* six: *capital plates* with a heptagonal one in the middle, surrounded by five hexagonal plates and two irregular ones at the mouth: *mouth* not prominent, situated on one side of the middle, a little within the line of the arms, closed by small valvular pieces, its inferior side resting on the superior angle of one of the scapulars.

Longitudinal diameter from three quarters to one inch and a half; transverse diameter from seven-tenths to one inch and two-fifths.

2. C. *loricatus*. Costals, five pentagonal, and one hexagonal.

Resembles the preceding, but there is only one hexagonal costal plate, and one interscapular plate.

Longitudinal diameter one inch and eleven-twentieths; transverse diameter one inch and three-tenths.

Dr. Bigsby obtained seven specimens of the *ornata* and one of the *loricata*. He informs me that "they are found loose in brown clay at the foot of the ravine at Lockport, in which the New-York canal mounts the parallel ridge of Lake Ontario. They are extremely numerous, but almost always worn and crushed. They are filled with the clay in which they are imbedded. They are from one-tenth to one-eighth of an inch thick in their parietes. The clay rests upon horizontal, black, conchiferous limestone, in which I found part of an *encrinital* stomach, bearing a close, if not perfect resemblance to the CARYOCRINITES described by Mr. Say."

In the second volume of Silliman's Journal, p. 36, I instituted a new genus for the truly singular animal *reliquium*, which Parkinson called *Ken-*

tucky Asterial fossil. I shall now proceed to correct the characters of that genus agreeably to the discoveries of the ingenious Miller, in this family, and to identify by name the species which I then indicated.

PENTREMITE.

Column cylindrical, perforated; segments articulating by radiated surfaces, with cylindrical side arms at irregular intervals: *pelvis* of three unequal pieces, two pentagonal and one quadragonal: *scapulæ* large, very profoundly emarginate for the reception of the tips of the radiating ambulacræ, obliquely truncated at the extremities, each side, for the reception of one side of a subrhomboidal plate or interscapular: *ambulacræ* five, radiating from the summit, and terminating at the tips of the emarginations of the scapulæ; each with a longitudinal, indented line, and numerous transverse striæ which terminate in a marginal series of pores, for the transmission of respiratory tubes: *summit* with five rounded openings (ovaries) and an angulated central one (mouth and anus,)

This singular genus is so remotely allied to any other hitherto discovered, that I do not think it can with propriety, be referred to any Family yet instituted. By its columnar support it is related to the Family Crinoidea, but the total absence of arms and hands excludes it from that very natural group. The superior termination, in which the ambulacræ, the rounded openings, and the central angulated one, are situated, has some affinity to the Family Echinidea, but the columnar support shows that it cannot be arranged there.

Having thus on its inferior portion a resemblance to the Crinoidea, and on its superior surface a decided analogy to the Echinidea, I think it may with propriety form an intermediate family, under the following name and characters.

Family BLASTOIDEA.

Column composed of numerous articulating segments, supporting at its summit a number of plates, so united as to form a calyciform body containing the vicera ; arms none ; branchiæ arranged in ambulacræ.

In a natural series these bodies constitute the link between the Crinoidea and the Echinidea, on the one hand, whilst on the other, the former is unquestionably, but not more obviously, connected with the Stelleridica, by the unequivocal intervention of Comatula and Marsupites. Of all the genera of Crinoidea, it is to PLATYCRINITES that PENTREMITE seems most closely related.

Species.

1. P. *globosa.* Body subglobular ; sutures with parallel impressed lines.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1825.]

Length one inch and one-fifth; greatest breadth one inch and three-tenths.

DESCRIPTION. *Pelvis* deep saucer-shaped, convex; longitudinal sutures without parallel lines of increment, but these are very obvious at the terminal margin: *scapulars* with the impressed lines of increment very obvious at base, and near the tip each side: *ambulacræ* with impressed lines equidistant between the central line and the lateral series of pores.

This large and fine species belongs to the Philadelphia Museum. It was brought from England by Mr. Reubens Peale, who understood that it was found in the vicinity of Bath. None of this species, I believe, has yet been found in America. The parallel lines of increment margining the sutures, distinguish this from the following species.

2. P. *pyriformis*. Body oblong, pelvis gradually attenuated.

Length from three quarters to one inch and a quarter.

This species is found in plenty in Kentucky, in the same localities, and intimately intermixed with the succeeding species; it may be readily distinguished by the gradual attenuation of the pelvis and contiguous parts, from the tips of the emarginations of the scapulæ, to the origin of the column. The first specimen I saw, was dug up in a garden at Reading, and was sent to my brother, B. Say, under the name of "petrified althea bud."

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1825.]

3. P. *florealis*, Schloth. Pelvis terminating abruptly, nearly horizontal.

Length from seven-tenths to nearly half an inch.

SYNONYMES.

Kentucky Asterial Fossil, PARK. ORG. REM. v. 2, *pl.* 13.

ENCRINITES *florealis*, SCHLOTH. petrif. (as quoted by Miller.)

This is extremely abundant in many parts of Kentucky, and on the margins of the Mississippi in a few places. Near Huntsville they are very numerous, and on the surface of a fragment of rock, three inches long, by two and a quarter wide, sent to the Academy by Mr. Hazard, of that place, I have enumerated eighteen specimens of this species more or less entire, and two specimens of the preceding species. On another still smaller piece of rock are twenty-one specimens, all in alto-relievo, two of which are of the preceding species. On a third fragment of rock, thirty may be counted, and on a fourth upwards of fifty.

That these animals were pedunculated and fixed, there cannot be any doubt. We see at the base of the pelvis a small rounded surface, perforated in the centre for the passage of the alimentary canal, and on the outer margin are very short but distinct radii of elevated lines, evidently intended for articulation with the first joint of the column. The column itself is always found in fragments accompanying the body of the animal, but never attached to it.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1825.]

296

I think it highly probable that the branchial apparatus communicated with the surrounding fluid through the pores of the ambulacræ, by means of filamentous processes; these may also have performed the office of tentacula in conveying the food to the mouth, which was, perhaps, provided with an exsertile proboscis; or may we not rather suppose that the animal fed on the minute beings that abounded in the sea water, and that it obtained them in the manner of the ASCIDIA, and by taking them in with the water. The residuum of digestion appears to have been rejected through the mouth.

[J. A. N. S., Phila., 1st Ser., Vol. IV, 1825.]

INDEX

Vol. I

N. B.—The numerals refer to the continuous paging and plate numbering of the Volume, not of the separate Bulletins.

Italic numerals indicate pages on which new genera, species, or varieties are described.

Italicized words indicate important references.

A

Abra, see Amphidesma.
Abra, see Egeria.
Abra æqualis........................ 92
Actæon, see Acteon.
Actæon (*Tornatellæa*) *bella*...188
    pl. 17, fig. 3.
  elevatus........................ 18
  galvestonensis................ *96*
    pl. 9, fig. 1.
  galvestonensis..................112
  lineatus........................ 96
  magnoplicatus................... 27
  punctostriatus.................. 96
  (*Tornatellæa*) *quercollis*...*188*
    pl. 17, fig. 4.
Actæonina, see Pasithea.
Acteon costellatus................ 13
  idoneus......................... 22
  lineatus........................ 25
  melanellus...................... 27
  pomilius........................ 36
  punctatus....................... 37
  pygmæus......................... 38
  striatus........................ 43
  wetherilli...................... 59
Actinocrinites....................347
Alabama, Midway of................139
Aldrich on New or Little Known Tertiary Mollusca from Alabama and Texas 55
Aldrich's collection..............120
  drawings........................120
  Midway fauna....................124
Allenton and vicinity.............147
  1 mi. N. of.....................148
Allenton, Oak Hill and vicinity 147

Althea bud........................283
Alveolites......................*277*
  glomeratus....................*277*
Amaura (*Amauropsis?*) *tombigbeensis*....................*234*
    pl. 22, fig. 22.
Amauropsis, see Ampullaria.
Amauropsis perovata............ 49
    pl. 1, fig. 4.
Americus, geol. notes on..........123
Ammonite..........................292
Amphidesma æqualis............... 92
  linosa.......................... 25
  profunda........................ 36
  subovata......................*328*
    pl. 29, fig. 10.
  tellinula....................... 45
Ampullaria perovata.............. 34
Anachis obesa.....................102
Anastasia Island, fossil shells of...............................295
Anatina claibornensis............ 10
Anchura...........................238
Ancilla, see Ancillaria.
Ancillaria altile................. 4
  lymneoides...................... 26
  prætenuis....................... 36
  scamba.......................... 40
  staminea........................ 42
  subglobosa...................... 43
  tenera.......................... 45
Ancillopsis, see Ancillaria.
Andersonville, notes and fossils from...........................123
Anolax, see Ancillaria.
Anolax gigantea.................. 20
  plicata......................... 35
Anomia gryphæa..................290

Aporrhais..............................219
pl. 20, fig. 9.
Appropriation of $400...........119
Arca arata.............................*313*
pl. 29, fig. 1.
centenaria.......................*314*
pl. 29, fig. 2.
cuculloides.......................... 14
floridana............................ 88
incile..............................*315*
pl. 29, fig. 3.
incongrua........................ 87
incongrua.........................296
labiata............................ 89
pl. 7, figs. 1, 1a.
labiata.............................108
nucleus...........................288
pexata.............................296
ponderosa var. *carolinensis*.................................. 88
ponderosa.........................296
rhomboidella..................... 39
transversa........................296
transversa var. *busana*..... *88*
sp....................................164
pl. 13, figs. 8, 9, a.
Architectonica, see Solarium.
Architectonica cælatura......... 9
Arkansas, Midway in............130
Astarte, see Lucina.
Astarte aldrichiana................148
aldrichiana.......................*176*
pl. 15, figs. 6, a.
callosa.............................. 9
castanea...........................327
concentrica.......................176
var. *mediavia*..................175
pl. 15, fig. 4.
minor............................... 28
minutissima...................... 28
nicklinii........................... 30
parva............................... 32
proruta............................ 37
recurva............................ 39
smithvillensis...................140
smithvillensis..................175
subpontis.........................151
subpontis.......................*176*
pl. 15, figs. 5, a, b.
sulcata............................ 44
tellinoides....................... 44
undulata....................... *326*
pl. 28, fig. 5.
ungulina.......................... 47
Astarte vicina.......................*327*
pl. 28, fig. 6.
Asterial fossil.......................284
Atys robustoides.................... *58*
pl. 3, figs. 4, 4a.
robustoides?...................188
pl. 17, fig. 5.
Avicula sp...........................162
pl. 12, figs. 4, a.
claibornensis.................. 10
limula.......................... 24

B

Baculites..................128, 137, 153
Baculites.............................288
compressa.......................*289*
knorriana.........................289
ovata..............................*289*
vertebralis........................289
Barite (Barium sulphate) 139
Basal Eocene.......................119
Basal or Wills Point clays 124
Bayou Departe.......................132
Belemnites 140, 141, 146
Belemnites...........................292
Bittium annettæ.....................104
galvestonense..................*104*
pl. 10, fig. 8.
galvestonense 114
Black Bluff division of the Lignitic...............................124
Black Bluff, Ala 139, 156
Blastoidea............................*351*
Blue Mountain section...........138
Bobo's, section at..................137
Borsonia............................... 61
Borsonia (young).................. 61
pl. 2, fig. 18.
(*Scobinella*) *conradiana*... *60*
pl. 2, fig. 13.
plenta............................ 60
pl. 2, fig. 12.
Bradford, Ark......... ....131, 132
Brazos river section of the Midway.................................128
Brougher's place...................138
Buff sand of Winchell...........121
Buff sand 124, 126
Buccimitra, see Buccinum.
Buccinorbis, see Monoceros.
Buccinum amœnum 5
aratum.......................... ..*303*
pl. 26, fig. 4.
parvum 32
perlatum......... 34

Buccinum porcinum..............*302*
pl. 26, fig. 3.
prorsum.......................... 36
sagenum.......................... 39
scala.............................305
sowerbii.......................... 42
Buccitriton, see Buccinum.
Bulbifusus, see Fusus.
Bulbifusus 208
Bulla, see Cylichna.
Bulla dekayi 15
st. hillairii........................ 43
Bullina leai........................ *59*
pl. 3, fig. 6.
Byssomia petricoloides........... 34

C

Cabot, Ark..........................131
Cadulus abruptus 56
compressus...................... 56
corpulentus...................... 57
depressus........................ 56
jacksonensis.................... 56
juvenis 56
newtonensis.................... 56
quadriturritus.................. 57
subcoarctatus.................. 56
subcoarcuata................... 56
turgidus 57, 144, 148
turgidus..........................187
pl. 17, fig. 2.
turritus 56
vicksburgensis 57
Callianassa gwyni 135
ulrichi 238
Calliostoma, see Turbo.
Calyptræa...........................230
pl. 22, figs. 10, 11.
costata............................*288*
costata 308
grandis...........................*306*
pl. 26, fig. 6.
Calyptrea, at Little Rock 121
Calyptraphorus, see Rostellaria.
Calyptraphorus chelonitis.......154
velatus var. compressus....127
128, 131, 132, 135, 138, 143
144, 146, 147, 148, 149, 150
velatus var. *compressus*....*218*
pl. 10, figs. 7, a, b, 8.
Calyptraphorus 151
Cancellaria alveata................ 4
babylonica 6
clavatula........................ 99

pl. 9, fig. 9.
Cancellaria clavatula..............112
costata............................ 13
elevata........................... 18
galvestonensis.................*100*
pl. 9, fig. 11.
galvestonensis.................112
gemmata......................... 20
impressa........................ 22
multiplicata.................... 29
parva............................. 33
plicata........................... 35
priama.......................... *49*
pl. 1, fig. 2.
pulcherrima.................... 37
reticulata var.................. 99
pl. 9, fig. 10.
sculpturata 40
tessellata....................... 45
Capitol Hill, Little Rock.......131
Cardita, see Venericardia.
Cardita alticostata.................. 4
Cardita Bluff..................127, 155
Cardita densata.....................172
hornii..............................172
morganiana.....................154
planicosta...................35, 174
subquadrata..............135, 174
wilmothii.........................154
Cardium antillarum................ 91
haitense 91
galvestonense.................. *91*
pl. 7, figs. 3, a.
galvestonense..................108
cf. magnum...................... 91
nicolletti 148
Caricella, see Mitra.
Caricella, see Turbinella.
Caricella claibornensis........... *49*
pl. 1, fig. 3.
leana..............................148
leana..............................194
pl. 17, fig. 20.
Caryocrinites.......................*347*
loricatus.........................*349*
ornatus...........................*348*
Cassis brevicostatus............... 8
nuperus.......................... 30
taitii............................... 44
Catenipora...........................282
escharoides.....................282
Catinus, see Sigaretus.
Cerithioderma (*Mesostoma*)
prima............................. 67
pl. 2, fig. 10.

Cerithiopsis, see Cerithium.
Cerithium claibornensis.......... 11
  claytonense........147, 151, 221
  claytonense.......................219
    pl. 20, figs. 10, 11.
  dislocatum....................... 97
  gainesense.......................151
  gainesense.......................*220*
    pl. 21, fig. 1.
  galvestonense..................*104*
    pl. 10, figs. 9, a.
  galvestonense..................114
  globoleve........................150
  globoleve.........................*220*
    pl. 21, fig. 2.
  mediaviæ.........................150
  mediaviæ.........................*221*
    pl. 21, figs. 3, a.
  nassula........................... 29
  penrosei..........................129
  penrosei..........................*221*
    pl. 21, fig. 4.
  platynema........................220
  solitarium....................... 42
  striatum.......................... 43
  sp. *a*...............................105
    pl. 10, figs. 10, a.
  sp. *a*...............................114
  sp. *b*...............................105
    pl. 10, fig. 11.
  sp. *b*...............................114
  sp...................................105
    pl. 10, fig. 12.
  sp...................................114
  at Little Rock.................121
Chalybeate Spring, Tippah Co., Miss., view of..................136
Chalybeate, section near.........137
Chama gainesensis.................151
  gainesensis......................*180*
    pl, 16, figs. 4, a.
Chione cancellata...............91, 92
  ulocyma.......................... 91
Chiton antiquus..................... 5
  eocensis.......................... 19
Cirsostrema claibornensis....... 11
Claiborne of Loughridge........124
Claiborne species..................1–48
Clavella, see Fusus.
Clavifusus, see Fusus.
Clayton, section 1–2 mi. N. E. of.................................149
  of Langdon......................124
  and vicinity.....................149
  (Midway) of Smith, Johnson and Langdon............125
Clayton fauna.......................150
Cochlolepas, see Hipponyx.
Cole's place..........................147
Colorado river section of Midway................................128
Columbella (*Strombina*) *galvestonensis*..........................*103*
    pl. 10, fig. 6.
  mississippiensis............... 65
    pl. 2, figs. 19, 19a.
  (Anachis) obesa..............102
Conoliva, see Oliva.
Conomitra, see Mitra.
Conorbis, see Pleurotoma.
Contact, Cretaceous–Eocene....142
  Cretaceous–Eocene, 3½ mi. N. E. of Snow Hill.........146
    Plate II.
  Cretaceous–Eocene, 2 mi. N. of Snow Hill..............146
Contributions to Geology, Lea 1
Conus claibornensis............... 11
  parvus............................ 33
  puncticulatus.................... 98
    pl. 9, fig. 6.
  puncticulatus...................112
  pygmæus......................... 98
  sauridens........................ 40
Corallium gothlandicum.........279
Corbis distans....................... 16
  undata............................ 47
Corbula alabamiensis............3, 95
  compressa...................12, 182
  concha............................ *71*
    pl. 6, fig. 6.
  contracta........................ 95
  cuneata...........................*328*
    pl. 32, fig. 2.
  galvestonensis.................. *94*
    pl. 8, figs. 4, a.
  galvestonensis.................110
  gibbosa........................... 20
  inæquale.........................*329*
    pl. 32, fig. 3.
  kjœriana......................... 95
  murchisonii..................... 29
  nasuta....................30, 94, 95
  oniscus........................... 31
  (*Potamomya*) *priscopsis*... *94*
    pl. 8, figs. 5, a.
  priscopsis.......................110
  subcompressa..130, 131, 135, 150
  subcompressa...................182
    pl. 16, fig. 9.

Corbula swiftiana?................ 94
   pl. 8, fig. 6.
  swiftiana?...........................110
Cordiera.............................. 61
  biconica............................ 61
Cornell University collection..119
Cornulina, see Melongena.
Correlation of the various Midway beds.................154–156
  with European deposits....154
  of Oak Hill–Pine Barren section with Prairie Bluff section.............................145
  with so-called "Cretaceous" beds of Maria Farinha, Brazil.................................154
Cossmann............................ 1
Crainesville, Tenn.................132
Crassatella alæformis.............178
  alta................................ 3
  compressa.......................319
  floridana......................... 89
  gabbi.........128, 130, 132, 134, 135, 137, 147
  gabbi...............................177
   pl. 15, figs. 7, a, 8, 9, 10, 11
  gibbesi........................... 89
  monmouthensis...............135
  protexta.......................... 37
  pteropsis..................135, 177
  sepulcollis................148, 149
  sepulcollis......................*178*
   pl. 16, fig. 1.
  tumidula.........................177
  undulata........................*318*
   pl. 30, fig. 2.
Crenella latifrons.................. 24
Crepidula..............................297
  cornu-arietes................... 13
  cf. convexa.....................106
  dumosa........................... 17
  lirata............................. 25
Creseis................................ 57
   pl. 2, fig. 5.
Cretaceous of White..............125
  above Ft. Gaines.............150
Crinoidea, Say on..................347
Crooked Creek section...........130
Cucullæarca, see Arca.
Crucibulum *cf.* auriculum.......106
Cucullæa hartii.....................154
  macrodonta.............128, 140, 143, 148, 149
  macrodonta..............165, 166
   pl. 13, figs. 10, a.

Cucullæa saffordi?..................130
  saffordi......131, 132, 135, 137, 138, 143, 144, 147, 148, 151
  saffordi var.....................147
  saffordi..........................165
   pl. 13, fig. 11.
   pl. 14, figs. 1, 2.
  transversa.................165, 166
Cyathocrinites......................347
Cylichna, see Volvaria.
Cylichna...............................189
  dekayi............................ 59
  galba..............................189
  meyeri........................... 58
   pl. 3, fig. 5.
  meyeri.....................144, 148
  meyeri...........................189
   pl. 17, fig. 6.
Cylichnella bidentata var. *galvestonensis*...................... *96*
   pl. 9, fig. 2.
  var. galvestonensis...........112
Cypræa sp...........................217
  lintea.............................217
Cytherea, see Meretrix.
  æquorea........................... 2
  comis.........................12, 48
  concentrica.....................326
  convexa..........................*325*
   pl. 31, fig. 3.
  discoidalis...................... 16
  globosa.......................... 21
  hydana........................... 22
  hydii............................. 22
  minima........................... 28
  mortoni.......................... 29
  nuttali........................... 30
  perovata......................... 34
  poulsoni......................... 36
  subcrassa....................... 43
  trigoniata....................... 46
Cytheriopsis, see Cytherea.

D

Dale's branch, fossils of.........148
Delphinula, see Solarium.
Delphinula depressa.............. 15
  plana............................. 34
Dennis Herald survey............129
Dentalium alternatum............ 4
  attenuatum.....................*330*
   pl. 27, fig. 3.
  mediaviense....................*187*
   pl. 17, figs. 1. a.

Dentalium microstria............ 55
    pl. 2, fig. 6.
  minutistriatum................187
  multannulatum............... *55*
    pl. 2, fig. 3.
  quadrangulare?.............. 95
  sulcatus..........................292
  tetragonum....................... 95
  thalloides........................ 45
  turritum.......................... 46
Derby's letter regarding the Maria Farinha deposits....157
Deitz, R., description of Anastasia Island.....................295
Dillwynella, see Turbo.
Diplodonta astartiformis......... 6
  deltoidea.......................... 15
Dispotæa..............................*307*
  tubifera...........................307
Divisions of the Eocene.........118
Donax, see Egeria.
Donax carinata var. *galvestonensis*.............................. *92*
  limatula.......................... 24
  tumida........................... 92
Donax................................297
Dosiniopsis?.........................131
Dreissensia sp...................... 87
Drillia lævis......................... 23

E

Egeria bucklandii.................. 8
  donacea........................... 16
  inflata............................. 23
  nana................................ 29
  nitens.............................. 30
  ovalis.............................. 31
  plana............................... 35
  rotunda............................ 39
  subtrigona........................ 44
  triangulata....................... 46
  veneriformis..................... 47
Emarginula arata................... 6
Enclimatoceras, absence on the Chattahoochee................158
  hyatti..............................236
  limestone.........................155
  rock.................................147
  ulrichi.................... 127, 128, 129, 131, 132, 139, 141, 143, 146, 148, 149, 171
  ulrichi............................236
    pls. 23, 24, 25.
Encrinites florealis.................353
Encrinus liliiformis................285
Eocene in Miss......................121
Eolignitic of Heilprin............125
Eriphyla galvestonensis......... 90
    pl. 7, figs. 2, a, b.
  galvestonensis..... 108
Erycina æquorea.................... 2
  rectilinearis.................... 39
Eucheilodon crenocarinata...... 61
  reticulata........................ 61
Eulima...................................103
Exilia pergracilis...........144, 148
  pergracilis......................204
    pl. 19, fig. 1.
Exilifusus, see Fusus.
Exogyra............140, 141, 146, 153
Exogyra...............................*291*
  costata.............................*291*

F

Falls county Midway.............129
Farinha, Brazil......................154
Fasciolaria? acutispira...........154
Fasciolaria elevata................. 18
  plicata............................. 35
  saffordi............................135
  saffordi...........................197
    pl. 18, fig. 2.
Faunal variation...................157
Favosites.............................278
  gothlandicum..................281
  striata............................*278*
  truncata 281
Featherstonhaugh..................121
Finch, John...........................300
Fissurella clairbornensis 11
  mediavia..........................147
  mediavia.........................*235*
    pl. 22, figs. 26, a.
  peruviana.........................308
  tenebrosa........................ 45
  redimicula.......................*308*
    pl. 27, fig. 1.
Fistulana larva 23
Flatwood's clays 125
Ft. Gaines, Midway fossils at..151
  and vicinity.....................150
Fossils from the Galveston deep well...........................85–107
Fossil zoophytes 275
Fulgur canaliculatus.............305
  carica.............................306
Fulgur? dallianum *210*
    pl. 19, fig. 13.

Fulgur eliceans 306
  eocense *62*
    pl. 4, figs. 7, 7a.
  eocense 144, 148
Fulgur 208
Fulguroficus sp 130
Fusimitra, see Mitra.
Fusus acutus 2
  altilis 4
  bellus 7
  bicarinatus 7, 209
  cinereus 305
  conybearii 12
  cooperi 12
  crebrissimus 14
  decisus 14
  decussatus 15
  delabechii 15
  explicatus 19
  fittonii 19
  harrisi *64*
    pl. 5, figs. 2, 8.
  hubbardanus 135
  hubbardanus *201*
    pl. 18, figs. 10, 11.
  inauratus 23
  irrasus 23
  limulus 24
  magnocostatus 27
  meyeri 144, 148
  meyeri 201
    pl. 18, fig. 12.
  minor 28
  mississippiensis 202
Fusus? mohri *64*
    pl. 4, fig. 6.
Fusus mohri 140, 144, 148
  mohri 203
    pl. 18, fig. 15.
  mortonii 29
  nanus 29
  ornatus 31
  ostrarupis 129
  ostrarupis 202
    pl. 18, fig. 13.
  pachyleurus 31
  pagodæformis 207
  papillatus 32
  parvus 33
  perlatus 34
  prorutus 37
  proscissus 37
  protextus 37
  pulcher 37
  4-costatus *303*
    pl. 26, fig. 5.
Fusus quercollis 138, 148
  quercollis *200*
    pl. 18, fig. 9.
  quinquespinus 210
  rannelloides 38
  raphanoides 38
  salebrosus 40
  sexangulus 41
  siphus *64*
    pl. 4, fig. 2.
  stamineus 42
  subscalarinus 65
  symmetricus 44
  taitii 44
  thalloides 45
  thoracicus 46
  tortilis? 138
  tortilis 144, 148, 151
  tortilis 203
    pl. 18, fig. 14.
  trabeatus 46, 209
  unicarinatus 202
  venustus 47
Fusus? whitfieldi *63*
    pl. 5, fig. 4.

G

Gabb's work on the Midway of Tenn 122
Gadus subcoarctatus 56
Gafrarium liratum 25
Galerite 286
Galveston deep well 85
Gari, see Psammobia.
Gastrochæna, see Fistulana.
Gastrochæna cimitariopsis 151
  cimitariopsis *184*
    pl. 16, fig. 13.
  gainesensis 151
  gainesensis *184*
    pl. 16, figs. 12, a.
  larva 71
    pl. 6, fig. 12.
Georgia, Midway of 150
Gill, Dr 139
Glyphostoma harrisi *61*
    pl. 2, fig. 11.
Gnathodon *cf.* cuneatus 93
Goniobasis texana *66*
    pl. 3, fig. 3.
  trigemmata 66
Grand Glaise, Ark 132
Gratelupia moulinsii 29

Graveyard hill, fauna ½ mi. W. of..........149
Graveyard hill fauna, 1 mi. N. of Allenton..........148
Gregorio.......... 1
Grupoceras..........237
Gryphæa..........141
pitcheri..........160, 238
trachyoptera..........154, 161
vomer..........135, 160
Gypsum crystals..........139
Gyrineum, see Ranella.

H

Hannah's, section at..........132
view of..........133
fig. 1.
Hannah's..........156
Hardeman Co., Tenn..........132
Harpa dechordata..........154
Harpa? dechordata..........214
Harper's work on the Midway of Miss..........121
Harris' collections..........120
Harris' Midway work..........124
Harris' section at Olsen's switch, Ark..........131
Harrison's mill, fossils on Lea's near..........150
Hickman group..........125
Hilgard's work on the Midway of Miss..........122
Hippagus isocardioides.......... 23
Hipponyx pygmæa.......... 38
Horn Hill limestone..........155
Horn Hill, Tex..........129
Hot Springs Co..........130
Hubbard, W. S..119, 136, 138, 150
Huddleston's, section at..........134
Hunter, Josh..........147

I

Independence Co., Ark..........132
Infundibulum trochiformis.......... 46
urticosum.......... 47
Isocardia fraterna..........*319*
pl. 30, fig. 1.
mediavia..........143, 144
mediavia..........*180*
pl. 16, fig. 5.
rustica..........320

J

Jackson Co., Ark..........132
Johnson's well, Little Rock..........131
Johnson, L. C..........120
Johnson's work on the Midway of Ala..........122
Josh Hunter's place..........147

K

Kaufman Co. Midway..........129
Keilostoma mediavia..........147, 150
mediavia..........*230*
pl. 22, figs. 8, 9, a.
Kentucky asterial fossil...284, 286 349, 353
Koken cited..........157

L

Labiosa canaliculata.......... 94
Lacinia, see Melongena.
Lævibuccinum, see Buccinum.
Lamna gracilis..........135
Langdon's work on the Midway of Ala..........123
Langdon's study of the Midway along the Chattahoochee..154
Lapparia, see Mitra.
Latirus alabamensis.......... *63*
pl. 2, fig. 17.
Lea's Contributions to Geol.... 1
Lea, H. C.......... 1
Leda, see Nucula.
Leda bella..........169
concentrica?.......... 89
elongatoidea.......... 69
pl. 6, fig. 2.
elongatoidea..........169
pl. 14, fig. 10.
lisbonensis.......... 69
pl. 6, fig. 4.
magna.......... 70
milamensis..........129, 134
milamensis..........168
pl. 14, fig. 8.
protexta..........69, 135, 169
quercollis..........*169*
pl. 14, fig. 11.
robusta.......... 69
pl. 6, figs. 1, 1a.
robusta..........170
saffordana..........151
saffordana..........*169*

pl. 14, fig. 9.
Leda semen 70
semenoides *70*
pl. 6, fig. 5.
Leiorhynus, see Fusus.
Leucozonia biplicata 144
biplicata 206
pl. 19, fig. 4.
Levibuccinnum lineatum .. 139, 144
lineatum 211
pl. 19, fig. 15.
prorsum 212
Levifusus, see Fusus.
Levifusus blakei 208
branneri 62
dalei 208
Levifusus? dalei 148
Levifusus dalei *210*
pl. 19, fig. 12.
hubbardi 138
hubbardi *209*
pl. 19, fig. 11.
pagoda 207
pl. 19, fig. 8.
suteri *63*
pl. 4, fig. 4.
suteri 144, 148, 207
suteri *208*
pl. 19, fig. 9.
trabeatoides 62, 208
trabeatus 62
pl. 5, fig. 6.
trabeatus 135, 144, 148
trabeatus 209
pl. 19, fig. 10.
Lignitic, Smith and Johnson ... 125
Limestone Co. Midway 129
Limopsis, see Pectunculus.
Lirofusus, see Fusus.
Lirofusus, see Terebra.
Lirofusus gracilis 21
Lister's figure of F. 4-costatus. 304
Lithodomus clairbornensis 11
claibornensis 69
pl. 6, fig. 14.
gainesensis 151, 163
gainesensis *164*
pl. 13, figs. 7, a.
Lithophaga, see Lithodomus.
Little Rock exposures 131
Littorina, see Tuba.
Littorina antiquata 5
Lonoke county, Ark 131
Loughridge's work on the Midway of Texas 122
Loxotrema 230
Lucina 297
alveata 4
anodonta *322*
pl. 29, fig. 9.
carinifera 10
claytonia 150
claytonia *183*
pl. 16, figs. 10, a.
compressa 12
contracta *321*
pl. 29, fig. 8.
cornuta 13
crenulata 90
cribraria *323*
pl. 32, fig. 1.
dentata 90, 324
divaricata var. .... .324
dolabra 16
floridana 90
fortidentalis *183*
pl. 16, fig. 11, a.
impressa 22
jamaicensis 322
lunata 26
modesta 28
pandata 32
papyracea 32
pomilia 36
rotunda 39
scabra 322
subobliqua *323*
subvexa 44
symmetrica 44, 183
Lupia, see Ampullaria.
Lutraria canaliculata 94, 296
papyria 32
Lyria 196
wilcoxiana 199
pl. 18, fig. 5.

M

Mactra, see Erycina.
Mactra 297, 328
decisa 14
dentata 15
grayi 21
lateralis 93, 329
parilis 32
prætenuis 36
quadricentennialis *93*
pl. 8, figs. 3, a, b.
quadricentennialis 110
Madrepora fascicularis 280

Madrepora truncata 279
Marginella anatina 5
  biplicata 7
  columba 12
  constricta 12
  crassilabra 13, 14
  humerosa 22
  incurva 23
  larvata 24
  ovata 31
  plicata 35
  semen 41
Markham's place 134
Martesia dalliana 151
  dalliana *185*
    pl. 16, fig. 15.
Maryland, fossil shells of 300
Matthews' Landing 143
  clays 156
Mazzalina impressa 206
    pl. 19, figs. 5, 6.
  impressa var. 151
  var. orientalis 151
  impressa var. *orientalis* ... *207*
    pl. 19, fig. 7.
McConnico's plantation 147
McConnico, Stonewall 147
McDonald's mill 136
Melania? vetusta 48
Melanopsis anita 67
  choctawensis 144
  planoidea *67*
    pl. 3, fig. 7.
Melongena alveata 5
Melongena? armigera 6
Melongena melongena 101
Meretrix 181
  var. *aldrichi* *48*
    pl. 1, fig. 1.
  cornelli *49*
    pl. 1, fig. 5.
  perovata var. *aldrichi* *48*
    pl. 1, fig. 1.
  ripleyana .. 135, 138, 139, 151
  ripleyana 181
    pl. 16, fig. 6.
  cf. ripleyana 146
Mesalia alabamiensis 131, 149
  alabamiensis 227
    pl. 22, fig. 1.
  pumila 129, 143, 147
  pumila 226
    pl. 21, fig. 15.
  pumila var. *allentonensis*. 227
    pl. 21, figs. 20, 21.
Mesalia pumila var. *hardemanensis* 226
    pl. 21, fig. 19.
  pumila var. *wilcoxiana* ... 226
    pl. 21, figs. 16, 17.
  vetusta 50
    pl. 1, fig. 6.
  watsonensis 150
  watsonensis *228*
    pl. 22, fig. 2.
  var. *wilcoxiana* 226
    pl. 21, figs. 16, 17.
Mesalia? 228
    pl. 22, fig. 3.
Mesostoma lisbonensis 67
Middleton and vicinity 134
  formation 125, 156
Midway Stage 115–270
  a stratigraphic and paleontologic unit 126
  as limited by the Geol. Surv. of Ala. 126
  type section of 126
  usage of the term 125
  and vicinity 143
  limestone 156
  at Little Rock, Ark. 121
  of Texas 127
Mississippi, Midway outcrops in 136
Mitra bolaris 8
  doliata 16
  eburnea 17
  elegans 17, 62
  flemingii 19
  fusoides 20
  gracilis 21
  hatchetigbeensis? 139
  hatchetigbeensis 200
    pl. 18, fig. 8.
  humboldtii 22
  lineata 25
  minima 28
  pactilis 32
  perexilis 33
  subpontis 151
  subpontis *200*
    pl. 18, figs. 7, a.
  terebriformis 45
Modiola alabamensis *68*
    pl. 6, fig. 13.
  saffordi 129, 132, 135, 146
  saffordi 163
    pl. 13, figs. 4, 5.
  subpontis 151

Modiola subpontis..............*163*
  pl. 13, figs. 6, a.
Modulus modulus?..................105
Monoceros, see Melongena.
Monoceros fusiformis.............. 20
  pyruloides........................ 38
  sulcatum.......................... 44
  vetustus.......................... 48
Monoptygma, see Ancillaria.
Monoptygma alabamiensis........ 3
  curta.............................. 14
  elegans............................ 18
Monterey, of Langdon............125
Morton's "Synopsis" etc......... 1
Muddy creek..................134, 157
Murex alternata..................... 4
  (Pteronotus) burnsi.......... 66
  elegantissimus.................. *65*
  pl. 5, fig. 3.
  engonatus 19
  (Pteronotus) grandispinosa 66
  mantelli.......................... 27
  matthewsensis...........144, 148
  matthewsensis..................215
  pl. 20, fig. 2.
  melongena.......................101
  morulus..................144, 215
  septemnarius..............41, 66
  shilohensis...................... 66
  vanuxemi........................ 47
Myoparo costatus.................. 13
Mysia, see Egeria.
Mysia, see Diplodonta.
Mysia ungulina......................183
Mytiloconcha incrassata......... 87
Mytilus incrassatus................ 87
  magellanicus..................... 87

N

Naheola.........................125, 139
  marls..............................156
Nassa acuta..........................102
  cf. ambigua.......................101
  cancellata.......................... 9
  galvestonensis..................*101*
  pl. 10, fig. 2.
  galvestonensis...................114
  peralta..............................102
  trivigalvesta....................*101*
  pl. 10, fig. 3.
  trivigalvesta......................114
  trivittata..........................298
  cf. trivittata..............101, 102
Natica ætites.......................... 2
Natica alabamiensis.........130, 131
  140, 148
  (*Girodes*) *alabamiensis*.....231
  pl. 22, fig. 14.
  canrena............................106
  duplicata..........................106
  eborea.............................. 17
  eminula...............18, 140, 144
  eminula............................233
  pl. 22, fig. 20.
  (*Lunatia*) *eminuloides*.....106
  pl. 10, fig. 13.
  gibbosa.......................20, 232
  interna............................*301*
  pl, 26, fig. 2.
  limula.............................. 24
  limula..............................232
  pl. 22, fig. 16.
  magno-umbilicata.............. 27
  mamma......................27, 232
  mediavia...........................151
  mediavia..........................*231*
  pl. 22, fig. 15.
  minima............................. 28
  minor.........................28, 233
  onusta..............................144
  (*Polinices*) *onusta*............232
  pl. 22, fig. 17.
  parva..........................33, 233
  perspecta..................144, 149
  perspecta.........................233
  pl. 22, fig. 21.
  rectilabrum...............135, 233
  reversa....................144, 148
  reversa............................233
  pl. 22, fig. 19.
  saffordia..........................*232*
  pl. 22, fig. 18.
  semilunata........................ 41
  striata............................. 43
National Museum collection...120
Nautilus danicus....................129
  rock................................147
  sowerbyanus......................154
Navicula, see Arca.
Neptunea constricta...............144
  constricta........................211
  pl. 19, fig. 14.
  impressa....................135, 206
  matthewensis......................211
Neritina sp.............................107
Nerinæa buarquiana...............225
Neverita, see Natica.
New Claiborne species........... 48
Niso, see Pasithea.

Nonconformability between Eocene and Cretaceous..152–153
  in Alabama........153
  in Arkansas........152
  in Georgia........153
  in Mississippi........152
  in Tennessee........152
  in Texas........152
Nucula, see Pectunculus.
Nucula æqualis........2
  bella........7
  brogniartii........8
  carinifera........10
  claibornensis........11
  cœlata........11
  concentrica........*317*
   pl. 29, fig. 6.
  equalis........2, 19
  lævis........*317*
   pl. 29, fig. 5.
  magna........26
  magnifica........26, 168
  media........27
  mediavia........139, 148, 149
  mediavia........*167*
   pl. 14, fig. 4.
  obliqua........*288*
  opulenta........31
  ovula........31, 148
  ovula........168
   pl. 14, fig. 3.
  pectuncularis........33
  pellucida........317
  percrassa........146
  plana........35
  pulcherrima........37
  semen........41
  sedgewickii........41
Nuculana, see Nucula.

O

Oak Hill and vicinity........147
Oak Hill outcrop, fossil fauna of........148
Oak Hill–Pine Barren section 126, 145
Obeliscus, see Acteon.
Obeliscus, see Pyramidella.
Obeliscus perexilis........33
Odontopolys texana........66
Odontostomia conoidea....103, 104
Odostomia conoidea........104
Oliva........302
  alabamensis........3
Oliva bombylis........8
  constricta........12
  dubia........17
  gracilis........21
  literata........100
  minima........28
  phillipsii........34
  reticularis........100
   pl. 9, fig. 12.
  reticularis........112
Olivula, see Ancillaria.
Olivella galvestonensis........112
  galvestonensis........*100*
   pl. 9, fig. 13.
  mediavia.....139, 144, 148, 149
  mediavia........*194*
   pl. 17, fig. 19.
  subtexana........114
  subtexana........*101*
   pl. 10, fig. 1.
Olsen's switch, Ark........130
Orbis rotella........39
Ostrea alabamiensis........3
  claibornensis........11
  bellovacina........309
  compressirostra........159
  compressirostra........*308*
   pl. 27, fig. 2.
  convexa........290
  crenulimarginata........129, 130 131, 134, 135, 136, 142, 143 144, 147, 149, 150, 151
  crenulimarginata........159
   pl. 11, figs. 1, a; pl. 12, fig. 1, a; pl. 13, fig. 1.
  cretacea........68
   pl. 6, fig. 10.
  denticulifera........135, 159
  divaricata........16
  lingula canis........25
  pincerna........34
  præ-compressirostra........159
  pulaskensis........121, 130, 131 132, 134, 135, 141, 143 147, 149, 151, 153
  pulaskensis........160
   pl. 11, figs. 2, a, b, c, 3, a.
  sellæformis........41
  semilunata........41
  tumidula........159
  at Little Rock........121
Ostreum polyleptoginglimum..287
Owen's section on Fourche creek........130
Owl creek marls........137

P

Palmer's mill.......146, 147
  frontispiece.
  beds.......156
Panopæa faujas.......329
  glycimeris.......330
  reflexa.......329
    pl. 32, fig. 4.
Papillina, see Fusus.
Pasithea aciculata....... 2
  cancellata....... 9
  clairbornensis....... 11
  elegans....... 18
  guttula....... 21
  lugubris....... 26
  minima....... 28
  notata....... 30
  secale....... 40
  striata....... 43
  sulcata....... 44
  umbilicata....... 47
Patulaxis.......228
Pecten alabamensis...140, 144, 148
  alabamensis.......162
    pl. 12, fig. 3.
  choctavensis....... 68
    pl. 6, fig. 7.
  clarkeanus....... 68
    pl. 6, fig. 11.
  claibornensis....... 11
  clintonius.......311
    pl. 28, fig. 2.
  deshaysii....... 16
  dislocatus....... 87
  inæqualis....... 87
  jeffersonius.......309
    pl. 28, fig. 1.
  lyelli....... 26
  madisonius.......310
  septenarius.......312
    pl. 28, fig. 3.
  scintillatus....... 68
  from Galveston well....... *86*
Pectunculus.......167
    pl. 14, fig. 3.
  aviculoides....... 6
  broderipii....... 8
  corbuloides....... 13
  cuneus....... 14
  decisus....... 14
  declivis....... 15
  deltoideus....... 15
  ellipsis....... 18
  idoneus....... 22
Pectunculus minor....... 28
  obliquus....... 31
  perplanus....... 34
  stamineus....... 42
  subovatus.......316
    pl. 29, fig. 4.
  trigonellus....... 46
Penrose's work on the Midway
  beds of Texas.......123
Pentacrinus caput-medusæ.......283
Pentremite.......284, 350
  florealis.......353
  globosa.......351
  pyriformis.......352
Periploma butleriana....... 71
    pl. 6, fig. 3.
Perna bazini.......163
  cornelliana.......150
  cornelliana.......162
    pl. 13, figs. 2, 3.
  torta.......286
Pholadidea.......186
Pholadomya.......148
  cuneata.......186
  mauryi.......132, 134
  mauryi.......185
    pl. 16, figs. 17, a.
Pholas costata....... 95
  dactylus.......186
  ovalis.......287
Phos galvestonensis.......102
    pl. 10, figs. 4, 5.
  galvestonensis.......114
Physa choctavensis....... 57
  elongatoidea....... 57
Pisania claibornensis....... 67
  (Tritonidea) johnsoni....... 65
    pl. 5, fig. 9.
Platycrinites.......351
Plicatula?.......147
Plicatula?.......161
    pl. 12, figs. 2, a.
Plicatula angulata.......313
  filamentosa....... 19
  gibbosa.......313
  marginata.......312
    pl. 28, fig. 4.
  plicata.......313
Pleurotoma, see Fusus.
Pleurotoma.......192
    pl. 17, fig. 14.
  acuminata....... 60
  acutirostra....... 2
  adeona.......144, 148, 149
  (*Surcula*) *adeona*.......190

pl. 17, figs. 9, 10.
Pleurotoma albida.................. 98
alternata......................4, 193
anacona.......128, 129, 130, 192
anacona..........................191
pl. 17, fig. 12.
baumontii.......................... 6
biseriata.......................... 7
cælata............................. 9
callifera.......................... 9
cancellata......................... 9
childreni.....................10, 193
cœlata............................. 12
conoides........................... 12
denticula..........................193
depygis............................ 16
desnoyersii........................ 16
elaborata.......................... 17
(*Cithara*) *galvestonensis*... *99*
pl. 9, fig. 8.
(Cithara) galvestonensis...112
gemmata............................ 20
hæninghausii....................... 22
infans............................. 61
langdoni......................... *60*
pl. 4, fig. 5.
lesueurii.......................... 24
lirata............................. 25
longipersa.........................144
longipersa.......................*192*
pl. 17, fig. 15.
lonsdalli.......................... 26
mediavia.........................*193*
pl. 17, fig. 16.
monilifera......................... 28
nupera............................. 30
obliqua............................ 31
ostrarupis.........................144
ostrarupis.......................*192*
pl. 17, fig. 13.
Pleurotoma? pagoda.................207
Pleurotoma persa......144, 148, 192
(*Surcula*) *persa*................191
pl. 17, fig. 11.
(*Drillia*) *quadricentennialis*.............. *99*
pl. 9, fig. 7.
(D.) quadricentennialis....112
rugatina........................... 39
rugosa............................. 39
sayi............................... 40
servata............................ 60
servatoidea...................... *59*
pl. 5, fig. 5.
silicata......................... *60*
pl. 4, fig. 3.
Pleurotoma subequalis 43
tabulata........................... 44
(*Drillia*) *quercollis*...........193
pl. 17, fig. 18.
waterkeynii........................193
Pleurotomaria?...................235
pl. 22, figs. 25, a.
Pleurotomella pagodiformis
var. quercollis....................144
whitfieldi.......................190
pl. 17, fig. 8.
Plicatula?.......................161
pl. 12, figs. 2, a.
Polynices, see Ampullaria.
Pontotoc county, fossils of 135
and vicinity.......................139
Porcellana, see Marginella.
Porites............................280
Porter's creek group 125
formation 136
Potamides alabamiensis 227
Prairie Bluff, hills to the north
of.................................141
section at 140
section............................145
Priority of the term Midway..125
Protocardia lene 179
nicolletti 130, 140
nicolletti 179
pl. 16, fig. 2.
cf. nicolletti 132
virginiana.........................179
Psammobia, see Solecurtus.
Psammobia eborea 17
filosa 19
Psammocola, see Psammobia.
Pseudoliva, see Monoceras.
Pseudoliva.......................214
pl. 19, fig. 22.
ostrarupis.........................129
ostrarupis.......................213
pl. 19, figs. 18, 19.
ostrarupis var. pauper......129
ostrarupis var. *pauper*......213
pl. 19, fig. 20.
var. *pauper*......................213
pl. 19, fig. 20.
scalina..141, 144, 147, 149, 150
scalina..........................214
pl. 19, fig. 21.
tuberculifera............212, 214
unicarinata..130, 140, 144, 148
unicarinata......................212
pl. 19, fig. 16.

Pseudoliva vetusta..........144, 148
vetusta..........213
pl. 19, fig. 17.
Pteromeris, see Astarte.
Pteropsis, see Lutraria.
Pulaski county, Ark..........130
Pyramidella..........103
larvata.......... 24
Pyramimitra, see Mitra.
Pyramimitra costata.......... 62
pl. 3, fig. 11.
Pyropsis perula..........144, 148
perula..........204
pl. 19, fig. 2.
Pyrula, see Melongena.
Pyrula cancellata 9
elegantissima.......... 18
juvenis 144, 149
juvenis..........*216*
pl. 20, figs. 5, 6.
multangulata..........217
penita.......... 33
smithii 42
(Fusoficula) texana.......... 66
tricostata 217

R

Rangia cuneata var. *galvestonensis*.......... *93*
pl. 8, figs. 1, a, b.
cuneata var. galvestonensis 110
Rangia? quadricentennialis... *93*
pl. 2, figs. 2, a, b, c.
Rangia quadricentennialis......110
Ranella maclurii.......... 26
macluri 67
Ranellina, see Ranella.
Reeve's place..........136
Renilla americana..........286
Rimella, see Rostellaria.
Ringicula, see Marginella.
Ringicula biplicata.......... 57
pl. 2, fig. 9.
butleriana.......... 57
pl. 2, fig. 8.
mississippiensis.......... 58
Rio Grande section..........127
Ripley Cretaceous 125
Miss, section ½ mi. S. of..153
clays and limestone..........156
formation..........125
and vicinity, exposures and sections at..........137
group, a misleading expression..........137
Rissoina alabamensis.......... *66*
pl. 3, fig. 8.
alabamensis..........144
alabamensis..........229
pl. 22, fig. 7.
Rocky Cedar creek..........130, 155
Rostellaria cuvieri.......... 14
lamarckii.......... 23
laqueata.......... 23
trinodifera..........218
velata..........47, 218

S

Safford's collection..........120
"Middleton Formation"...123
work on the Midway of western Tenn..........122
Saline county, Ark..........130
Salt branch of Little Brazos...129
Sandy creek, Ga..........151
beds 156
Say, Thomas; his poleontological writings..........275
Scala..........234
pl. 22, fig. 23.
galvestonensis..........*103*
pl. 10, fig. 7.
galvestonensis..........114
Scalaria bella.......... 7
carinata.......... 10
elegans.......... 18
nassula.......... 29
planulata.......... 35
quinquefasciata.......... 38
sessilis.......... 41
staminea.......... 42
venusta.......... 47
Scaphander alabamensis.......... *58*
pl. 3, fig. 2.
alabamiensis..........148
primus.......... 58
pl. 3, figs. 1, 1a.
watsoni.......... 58
Scaphella..........196
pl. 17, fig. 23.
showalteri..........148
showalteri..........195
pl. 17, fig. 21.
Scaphites..........153
Scobinella.......... 61
cœlata.......... 60
crassiplicata.......... 60
Section of Galveston deep well 86

Semele, see Amphidesma.
Semicassis, see Cassis.
Sergipe........157
Serpula granifera........*330*
  pl. 27, fig. 4.
  squamulosa........ 42
Shell creek, section on........142
Sigaretus arctatus........ 6
  bilix........ 7
  (*Sigaticus*) *clarkeanus*........ 68
  pl. 2, fig. 16.
  declivus........ 15
  perspectivus........106
Siliceous Claiborne........125
Siliquaria claibornensis........ 11
  vitis........ 48
Simpulum showalteri........216
Sipho erecta........ *65*
  pl. 5, fig. 7.
Smart, Dr........150
Smith and Johnson's work on the Midway of Ala........123
Snow Hill and vicinity........144
Solariella alabamensis........234
  pl. 22, fig. 24.
Solarium........229
  pl. 22, fig. 6.
  alabamense........144, 148
  alabamense........228
  pl. 22, fig. 4.
  alveatum........ 5
  amœnum........ 5
  antrosum........ 6
  bellum........ 7
  bilineatum........ 7
  cancellatum Con........ 9
  cancellatum Lea........ 10
  cupola........229
  elaboratum........ 17
  elegans........ 18
  exacuum........ 19
  funginum........ 20
  granulatum........21, 105, 106
  henrici........ 22
  ornatum........ 31
  periscelidum........144, 148
  periscelidum........229
  pl. 22, fig. 5.
  scrobiculatum........ 40
  stalagmium........ 42
  tricostatum........ 46
Solecurtus blainvilli........ 8
South Carolina, fossils from........300
Spencer's work on the Midway of Ga........123
Spirialis choctavensis........ 57
  elongatoidea........ 57
  pl. 3, fig. 9,
Spisula quadricentennialis........ 93
Stalagmium margaritaceum........ 27
Stanton's view as to the "Cretaceous" character of the fauna of Maria Farinha........154
Stomatia, see Sigaretus.
Strepsidura ficus........ 65
  pl. 4, figs. 1, 1a.
  heilprini........ *64*
  pl. 5, fig. 1.
  heilprini........144, 148
  heilprini........205
  pl. 19, fig. 3.
  laqueata........ 23
  lintea........ 26
  lirata........ 26
  mediavia........151
Strepsidura? mediavia........147
  mediavia........*205*
  pl. 18, figs. 16, a, 17.
Strigilla galvestonensis........ *92*
  pl. 7, fig. 4.
  galvestonensis........108
  cf. pisiformis........ 92
Strombina gibberula........103
  gibberula var. galvestonensis........ 114
Styliola simplex........ 57
Sucarnochee or Black Bluff Lignitic........125
Sulcobuccinum, see Monoceros.
Surcula, see Pleurotoma.
Sycotypus, see Pyrula.
Syndosmya æqualis........ 92
Synonymy of Conrad's and Lea's species........1–48

T

Tehuacana, Tex........129
  limestone........155
Tellina........182
  æquistriata........*321*
  pl. 29, fig. 7.
  alta........ 4
  ostracea........321
  papyria........ 32
  plana........ 35
  punicea........ 71
  raveneli........ 39
  scandula........ 40
  sillimani........ 41

Tellina subtriangularis......... *70*
pl. 6, figs. 8, 8a.
Tenagoda, see Siliquaria.
Terebra concava.................... 97
constricta....................... 12
costata.......................... 13
dislocata...................... 97
pl. 9, fig. 3.
dislocata........................112
galvestonensis................. *98*
pl. 9, fig. 5.
galvestonensis..................112
gracilis......................... 21
langdoni....................... 97
pl. 9, fig. 4.
langdoni.........................112
multiplicata..................... 29
polygyra......................... 36
venusta.......................... 47
Terebratula ornithocephala.....293
plicata........................*291*
Terebrifusus, see Buccinum.
Terebrifusus amœnus........... 62
pl. 2, fig. 15.
gracilis......................... 62
multiplicata..................... 62
Teredo simplex..................... 42
Texas, Neocene Mollusca of.... 85
Tippah county, Miss.............121
fossils of.......................135
Tornatella *cf.* bella.............131
bullata.......................... 96
Tornatellæa bella............139, 143
quercollis 132, 149
Tornatina bullata.................. 96
Trigonocœlia, see Pectunculus.
Triquetra, see Erycina.
Triton (*Ranularia*) *eocensis*...215
pl. 20, fig. 3.
pyramidatum...............38, 67
showalteri.......................144
(*Simpulum*) *showalteri*....216
pl. 20, fig. 4.
Trochus alabamensis..144, 148, 235
planulatus....................... 35
Trophon morulus..................214
pl. 20, fig. 1.
Troy and vicinity..................149
Tuba alternata..................... 4
(*Mathilda*) *claibornensis*.. 67
pl. 2, fig. 7.
striata.......................... 43
sulcata.......................44, 67
Tubipora catenularia..............282
Tubulostium........................141
Tubulostium bed....................155
dickhauti........................238
Tuomey's Midway fossils........121
Turbinella fusoides................ 20
prætenuis........................ 36
prisca........................... 36
pyruloides....................... 38
Turbo conoideus....................103
lineata.......................... 25
naticoides....................... 30
nitens........................... 30
parva............................ 33
Turritella alabamiensis.....128, 131
144, 147, 148, 149
alabamiensis...................223
pl. 21, fig. 6.
allentonensis....................227
bellifera........................224
cœlata...........................223
carinata H. C. Lea.............. 10
carinata Lea..................... 10
concava.......................... 97
conoidea.........................292
eurynome.........................224
gracilis......................... 21
hardemanensis....................135
var. hardemanensis..........226
humerosa..........146, 150, 151
humerosa.......................224
pl. 21, figs. 10?, 11, 12, 13.
humerosa vr. eurynome } 129
var. bellifera }
var. levicunea...........144, 151
var. *levicunea*.................224
pl. 21, fig. 9.
lineata.......................... 25
monilifera....................... 29
mortoni..139, 131, 132, 135, 138
141, 143, 146, 147, 184, 222
mortoni var. levicunea.....148
mortoni var. *levicunea*.....*224*
pl. 21, fig. 9.
multilira.................131, 224
nerinexa.........................128
nerinexa.......................225
pl. 21, fig. 14.
nerinexa?........................141
obruta........................... 31
plebeia........................*301*
pl. 26, fig. 1.
pumila...................135, 151
saffordi.........................135
saffordi.......................223
pl. 21, fig. 7.
subgrundifera..................105

Turritella sylviana.........154
tennesseensis.........135, 151
tennesseensis.........222
pl. 21, fig. 3.
or bored limestone, Tenn. 134
limestone.........155
rock.........147, 150, 154, 158
at Little Rock.........121
Typhis gracilis......... 21
Typical fossils of the whole Midway Stage.........127

U

Ulrich's collection at Olsen's switch.........130
Umbraculum......... 59
pl. 2, figs. 14, a.
planulatum......... 59

V

Variation of faunas.........157
Venericardia alticostata....127, 128
129, 130, 140, 144
146, 148, 149, 151
alticostata.........171
pl. 14, fig. 12.
alticostata var.........138
ascia.........172
complexicosta.........172
granulata.........*318*
pl. 31, fig. 1.
mooreana.........172
parva......... 33
perantiqua.........171
planicosta.........128, 129
130, 131, 132, 134, 135
138, 143, 144, 147, 151
planicosta.........172
pl. 14, fig. 13.
planicosta var.........137, 150
planicosta var. regia.........172
planicosta var. smithii 147, 173
rotunda......... 39
sillimani......... 42
var. smithii.........138, 147
var. *smithii*.........173
pl. 14, fig. 14.
15, figs. 1, 2.
transversa.........46, 173
Venus castanea.........327
deformis.........*324*
pl. 31, fig. 2.
Venus *cf.* mercenaria......... 91
paphia?.........325
ripleyana.........135, 181
rustica.........320
ulocyma......... 91
Verticordia.........148
Verticordia sp.........185
pl. 16, fig. 16.
Voluta, see Turbinella.
Voluta ambigua.........198
cooperi......... 13
crenulata.........198
defrancii......... 15
dubia......... 17
florencis.........150, 151
florencis.........*196*
pl. 18, figs. 6, a.
lyroidea.........146, 147
lyroidea.........196
pl. 17, fig. 22.
parkinsonii......... 32
parva......... 33
petrosa......... 34
sayana......... 40
showalteri.........140, 144, 195
vanuxemi......... 47
Volutella, see Marginella.
Volutilithes, see Voluta.
Volutilithes limopsis.........127, 128
144, 148
limopsis.........198
pl. 18, fig. 3.
lyroidea.........196
quercollis.........148
quercollis.........*199*
pl. 18, fig. 4.
rectus......... 66
pl. 3, figs. 12, a.
rugatus.........139, 143, 144
148, 149, 196
rugatus.........197
pl. 18, fig. 1.
rugatus var. saffordi.........127
132, 138
rugatus var. *saffordi*.........*197*
pl. 18, fig. 2.
cf. saffordi.........131
var. saffordi.........140, 144
Volvaria bulloides......... 57
pl. 3, fig. 13.
galba......... 20
Volvula *cf.* cylindrica......... 96
cylindrica......... 97
oxytata......... 97

W

Walnut, Miss........................136
Wills Point clays...............129, 155
White county, Ark...................131
White on Brazilian Midway,
"Cretaceous," beds..........154
White's work on Ulrich's collection near Little Rock,
Ark..............................122
Whitneya ficus......................65
Winchell............................121

X

Xenophora.........................231
pl. 22, figs. 12, 13.

Y

Yoldia corpulentoides.............70
pl. 6, figs. 9, 9a.
eborea..........127, 128, 130, 131
132. 134, 138, 139
141, 144, 148, 149
eborea............................170
pl. 14, fig. 7.
kindlei.............................132
kindlei...........................170
pl. 14, fig. 6.

Z

Zoophytes...........................275

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APPENDIX TO BULLETIN
No. 5

January, 1897.

PREFACE.

We publish herewith a few notes from Long's Expedition to the Rocky Mountains, or more accurately, "Account of an Expedition from Pittsburgh to the Rocky Mountains, Performed in the years 1819 and '20, by Order of the Hon. J. C. Calhoun, Sec'y of War: under the Command of Major Stephen H. Long. From the Notes of Major Long, Mr. T. Say, and Other Gentlemen of the Exploring Party. Compiled by Edwin James, Botanist and Geologist for the Expedition. In two Vols.—With an Atlas. Vol. I. Philadelphia: H. C. Carey and I. Lea, Chesnut St. 1823."

Thomas Say accompanied this party as zoologist and hence it is to be presumed that the following notes were mainly, if not wholly, from his observations. The compiler, Edwin James, states in the preliminary notice, page 1, that important contributions of entire passages from Major Long and Mr. Say, are recognized in various parts of the work, but he has not always been careful to indicate the place of their introduction. Again, some of the new species are credited directly to Say, as will be seen by consulting these notes. We therefore have no hesitation in publishing all these paleontological foot notes as Say's work, though their diction and orthography show the hand of the compiler. Only such portions of the main text of the work have been introduced here as tend to make the meaning of the paleontology more clear.

The attention of the present publisher was called to these notes by Mr. Weller of Chicago University.

G. D. HARRIS.

Ithaca, N. Y., Jan. 4th, 1897.

Between Loutre island and Cote Sans Dessein, compact limestone occurs, in horizontal strata, along the sides of the Missouri valley. It is of a bluish white colour, compact structure, and a somewhat conchoidal fracture, containing few organic remains. It alternates with sandstones, having a silicious cement.* * * * *

[*Foot note, page 84*].

* From Bay Charles hill, 4 miles below Hannibal, Missouri, we received, through Dr. Sommerville, several organic remains. Among them are the following:

Carbonate of Lime:

One specimen contains exclusive quantities of segments of the Encrinite of small diameter, from 1-4 of an inch down to minute.

Another specimen also with numerous small Encrinites has a very wide and short radiated Productus.

Another specimen a grayish chert, containing cavities formed by the solution and disappearance of encrinites, the parts of these which were originally hollow when in the state of carbonate of lime, being subsequently filled with chert, now show the nature of the fossil, being cylindrical cavities, with a solid centre and transverse partitions—the largest 3-10ths of an inch wide.

From Rector's hill, adjoining the village of Clarksville, Missouri, from Dr. Sommerville's collection:

A specimen of oolite—carbonate of lime.

It is composed of small spherical granules in contact with each other, which, in their fracture, exhibit rather a concentric tendency, with the appearance of a central nucleus; but we could not perceive any decided evidences of former organization in them. Imbedded in the mass are a few columnar segments of encrinites, and a portion of a compressed bivalve, which, in the form of its radiating lines, resembles a pecten.

From Charboniere:

A specimen in argillaceous sandstone of a portion of a leaf like the Nelumbium—It is only the middle portion of the impression of the leaf that remains, being of an oval form of about five inches in greatest diameter, the rest being broken away; the stalk has been broken off at the junction of the leaf.

Productus *spinosus*. SAY.

A small species of terebratula, in width two fifths, and in length more than seven-tenths of an inch—an internal cast—individuals very numerous, varying much in size, the smallest being about one-fifth of an inch wide.

From the Mammelles near St. Charles:

Productus: a portion of a valve, and smaller portion of the opposite valve of a remarkably large species, of which the proportions may have been not dissimilar to that of the Ency. Meth. pl. 244, fig. 5—the striæ are similar to those of that shell, except in being somewhat smaller, and the groove of one valve, and consequent elevation of the other, not so profound, less abrupt, and more angular in the middle, and

[*Foot note, page 85*].

far less prominent on the edge of the shell. It may justly be named *grandis*, as its hinge width was more than 3 1-2 inches.

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

Horizontal strata of sandstone, and compact limestone, are disclosed in the cliffs on both sides the valley of the Missouri. These rocks contain numerous remains of Caryophilla, Productus, and Terebratulæ.*

[*Foot note, page 106*].

* From Fort Osage.

Productus spinosus. Say. Longitudinally and transversely subequally striated, the transverse striæ somewhat larger than the others; a few remote short spines, or acute tubercles, on the surface, arising from the longitudinal striæ.

Breadth an inch and a half; the striæ are somewhat indistinct—as in No. 5.

Productus incurvus. Say. Shell much compressed; hinge margin nearly rectilinear: surface of the valves longitudinally striated; convex valve longitudinally indented in the middle; the beak prominent and incurved at tip; opposite valve with a longitudinal prominence in the middle; the beak incurved into the hinge beneath the other beak and distant from it.

Width more than 2 2-5 inches—A few univalves also occurred, but they were so extremely imperfect that their genera could not be made out. •

[*Foot note, page 107*].

A dark coloured carbonate of lime, containing small Terebratulæ like the T. ovata of Sowerby, but less than half as long.

No. 1.—A mass of carbonate of lime, containing segments of encrinites in small ossicula.

6.—A Caryophylla of a single star, about 4 inches long, of an irregularly transversely undulated surface, imperfect at each end, but seems to have been attached at base—Near the base it is bent at an angle of about 45 degrees.

Some small and young specimens of the Terebratula, like T. subundata of Sowerby.

Miliolites centralis—*Say.*

12. Astrea. A species of very minute alveoles. From the state of the petrifaction no radii are perceptible, so that the genus is not determinable.

Saltworks near Arrow Rock. Columnar segments of the Encrinus.

Inferior portion of the head of a Pentramea. *Say.*

Segments of the column of an oval encrinus, much narrower in the middle than the oval vertebra of an encrinite represented by Parkinson, Vol. 2, pl. 13, f. 40—resembling those of the genus *Platycrinites* of Miller.

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

CHAPTER VIII.

Winter Cantonment near Council Bluff—Councils with the Otoes, Missouries, Ioways, Pawnees, &c.

The position selected for the establishment of winter quarters for the exploring party, was on the west bank of the Missouri, about half a mile above Fort Lisa, five miles below Council Bluff, and three miles above the mouth of Boyer's river. At this place we anchored on the 19th September, and in a few days, had made great progress in cutting timber, quarrying stone, and other preparations for the construction of quarters.

Cliffs of sparry limestone rise in the rear of the site we had selected, to an elevation of near three hundred feet.* At times of low water, strata of horizontal sandstone, are disclosed in the bed of the Missouri. These pass under and support the limestone. Both these strata probably extend in connexion, some distance to the west; but as they are deeply covered with soil, we could not accurately ascertain their boundary in that direction. On the map accompanying the second volume of this work, we have traced a line running from the Canadian river of the Arkansas, to the Elk Horn, between 96° and 98° west longitude, and marking what we supposed nearly the westernmost limit of the horizontal limestones, and the argillaceous sandstones, disclosed in the beds of the larger rivers.

Both these strata, embrace numerous relicks of marine animals, many of which we collected.†

[*Foot notes, page 146*].

* Height of the bluff ascertained by Lieut. Graham;

Trigonometrically,	- - - -	271 feet.
Barometrically,	- - - - -	277

† We add some notices of a few of the most important.

1. Terebratula.—A specimen considerably resembling the T. *subunda-*

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

[*Foot note, page 147*].

ta of Sowerby, in the undulated line of the edges of the valves; but it is a much more depressed shell, and of a much less rounded form.

In the young state, the undulation of the edge is not very distinct, but this character increases with age, so that in the young state, it appears like a totally different species from the adult.

2. In the same rock are very numerous arquated spines, like ribs of fish, some of them 1 1-2 inches long.

3. A fragment of a Terebratula or Productus, imbedded, with very long spines, which may possibly be the same with the above.

4. A specimen being a mass of comminuted fragments of shells, amongst which are only recognizable a few segments of the column of the Encrinus, and minute turretted univalves of five whirls which resemble Turritella, and are about one-twentieth of an inch long.

5. Millepora *cylindrica. Say.* Branched, cylindric; *pores* very regular, alternate, oval, placed nearer to each other than the length of their own transverse diameters, and resembling those of an *Alveolite.*

Diameter, about one-tenth of an inch.

6. Segments of the column of Encrinus of authors, of a pentagonal form.

7. Ossiculæ of the body of a crinoid animal of the analogous species to No. 21.

8. Fragment of a Perna?

9. A mass of argillaceous sandstone, containing spines of a Linnæan Echinus, belonging probably to the genus Cidarites of Lamarck. Of these spines some are elongate-conic, others slightly fusiform, obtuse and slightly dilated near the tip, both are armed with short asperities throughout their length. They resemble in some degree those of the Cidarites *pistillaris* of Lamarck, but they are smaller, less fusiform, and the asperities are not so prominent.

In the same mass are fragments of Encrinus, and fragments of Retepore.

10. Retepore, much resembling the Milleporites *flustriformis* of Martin, Petrif. Derbi. pl. 43, fig. 1 and 2., but the alveoles in our specimens are rather smaller.

11. Millepora *cylindrica. Say.* Of the diameter of half an inch.

12. Productus *subserratus. Say.* Shell transvere, convex valve semicircular, destitute of asperities or striæ, longitudinally indented in the middle; line of the hinge rectilinear, half as long again as the length of the shell, with three or four spines or serratures on each side towards the angle; *umbo* not prominent, the beak hardly prominent beyond the line of the hinge. Length, more than three-tenths; breadth, more than one half an inch. A large specimen was four-fifths of an inch wide.

If we except the beak, the outline of this shell as respects the hinge margin and the sides, considerably resembles that of P. *spinulosus* of Sowerby, but the base is far more obtusely rounded, and it is a shorter shell comparatively with its width. The serratures are very often broken off.

[*Foot note, page 148*].

The curvature of the sides, does not in the slightest degree project beyond the angles of the hinge line.

13. An imperfect cast, very like the Terebratula *subundata* of Sowerby, and of equal magnitude.

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

14. Pentagonal ossiculæ of the trunk of Encrinus of authors, which in outline, may be compared to figs. 61 and 62, of plate 13, vol. 2, of Parkinson's Organic Remains, but their surfaces do not now exhibit any sculpture.

Many of these shells exhibit the most unequivocal evidences of having been in a plastic state, at some period or other, since their deposition in their present situations. The fine striæ of a Productus *lineolatus*, are so interlaced on the middle of a valve of one of our specimens, as at once to convince every observer, of the shell having been thus partially dissolved, and when in this state, to have been gently rubbed by some other body, in two directions proceeding obliquely to the same point, so as to throw the striæ in that part, entirely out of their proper longitudinal direction. It is very common to find shells, unnaturally flattened or compressed in various ways and degrees, often without any fracture in the shell or cast; a circumstance which certainly could never happen to the shell, unless it was in a plastic state, or in a state of partial solution.

16. A specimen of carbonate of lime, on its surface a mass of sub-parallel tubes, connected by short lateral processes. The whole much resembles, and is probably congeneric with the Erismatholithus tubiporites, (*catenatus*) of Martin's Petrif. Derbi. t. 42, fig. 2, but the connecting processes of the tubes, are much shorter than they are represented in that figure; but it correspouds much more exactly with the tubiporite, figured by Parkinson in his *Organic Remains*, vol. 2, pl. 1, f. 1., and may with great propriety, form a new genus, the type of which will be the Tubipora Strues of Lin.

The genus is probably allied to Favosites and Tubipora.

17. Trilobus. The abdomen of a species of this singular genus, frequently occurs in the sandetone of the Missouri; near Engineer Cantonment they are very common. The largest was rather more than one inch long, by about 1 3-10 inches in breadth at base, but the more general length is about three-fourths of an inch. The tergum or intermediate lobe is narrow, being not more than two-thirds of the width of the flanks, and much more convex than those parts.

But a single specimen occurred which we can, without any doubt, consider as the thorax of a Trilobus; but whether or not it appertains to the same species with the above, or to some other of which we have no other fragment, we are at a loss to determine. Like the abovementioned abdomen, it is distinct from any that we have seen figures of. It is of a narrow lunate form, highly convex, the disk destitute of sculpture, and the eyes prominent.

18. Many imperfect casts of two different kinds of bivalve shells occur near Engineer Cantonment, of which one may possibly have been a *Cardita*.

[*Foot note, page 149*].

19. Tooth of a Squalus, which seems to approach nearest to those of *Sq. maximus*, by its compressed conic form.

Greatest length 2 1-10 inches.

Thickness more than 2-5 of an inch.

The sides are rounded, without any appearance of serratures; thickened near the tip, and more compressed near the base.

20. Tooth of a Squalus, something like that of *S. galeus*, but less of a triangular form, and the lateral processes are more distinct, and also less triangular than in that species.

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

21. An imperfect body of a crinoid animal, *Encrinite* of Authors; the fragment is about one half of the inferior portion of the body, from which the following description is made out, taking into view the whole circumference. The plates composing the *first costal* series, (Miller) five in number, are longitudinally pentangular, much curved inwards towards the base to join the *first columar joint*, or perhaps the *pelvis;* at which part the plate is narrow, being about one-ninth of an inch, whilst the other sides are nearly three-tenths of an inch each, the superior ones being somewhat longer than the others; the *second costal plates*, (Miller) five in number, are transversely pentangular, the superior joint being long, the lateral ones shortest, the former being one-half an inch in length, the latter 3-20, and the inferior sides which articulate to the segments of the pelvis, somewhat less than 3-10 of an inch; the margins of the first costal joints, as well as the superior margins of the segments of the pelvis, are armed with a few tubercles, some of which seem to have been perforated; all the superior pieces are wanting in our specimen, but the truncated surface, on which the *scapulars* (Miller) rested, is of a pentagonal outline, and composed of a series of horizontal equilateral triangles, two to each side, which are separated on each side from the adjacent pairs by a deep groove, which corresponds, and is nearly at right angles with the exterior sutures, which join the first costal joints to each other; these triangular surfaces, are also separated from the exterior edge by two grooves, which are crenated, and inclose an oblong foramina between them; a single *intercostal plate* occurs, interposed between two of the *second costals*, it is of an oblong hexagonal form, its base resting upon the extremity of a segment of the *first costals*, which is truncated to receive it, the superior portion of this plate is much bent inward towards the abdominal cavity, its tip is quadrate and concave.

The whole exterior surface of this reliquium, with the exception of the tubercles, and sutural impressed lines, is plain and equable.

If we have not mistaken the pieces of this imperfect specimen the pelvis is wanting, but the cavity in which it existed, must have been about 3-20 of an inch in diameter.

The plate-like form of the ossicula, and their mode of articulation with each other, by an extension horizontally inwards, as we have described above, in the case of those plates which we have considered as the *second costals*, seem to indicate, that this species ought to be referred to the second division of the Crinoidea, or *Semiarticulata* of Miller. It certainly, however, cannot be at all referred to Poteriocrinites, the only genus which that author has framed in the division of the family. We refrain from distinguishing it by a name either generic or specific, until other specimens can be obtained, in which the characters are less equivocal.

[*Foot note, page 150*].

We have two *second costal plates*, which made part of distinct individuals, larger than the above described one. Of these the surface of one is perfectly glabrous, whilst that of the other has light orbicular indentation instead of tubercles; a third very small one is perfectly smooth like the first, and doubtless formed part of the body of a young individual.

Another plate found near the same spot with the above, is of a somewhat triangular form exteriorly, or rather like the face of a truncated pyramid, of which the middle of the summit is a little produced in the form of a right angle, thus offering a scollop on each side of the apex for the adaptation of superior ossiculæ. On divesting it carefully of its extraneous matrix, we discovered that it was readily adjusted by its base to the

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

summit of those segments of the fragment above described, which we have supposed to be *second costals*, a prominent line on its base corresponding with the inner one of those grooves which we have described, to characterize the superior face of those plates. This plate then, agreeably to the relations in which we have viewed the preceding pieces, must be a *scapula;* it is susceptible of considerable hinge-like motion, and appears to have been much less firmly attached to the costals than the latter are to each other.

A segment of a crinoid animal, which seems to have been a *first costal joint* of a *Pentacrinus* of Parkinson, occurred near the same place.

22. Productus *pectenoides. Say.* Convex valve, with a central longitudinal indentation; the whole surface is longitudinally ribbed, each rib being marked by two striæ, in addition to the central carina.

The shell is not of frequent occurrence, and a perfect specimen has not yet been obtained, but the portions we have examined, are sufficient to show that it is perfectly distinct from either of the species we have mentioned. We do not find any species figured or described by authors, like it.

23. *Productus compressus. Say.* Shell much compressed, with numerous, acute striæ, upwards of fifty in number on each valve, the alternate ones rather smaller; a very slight central longitudinal indentation, on the convex valve; outline suborbicular; hinge edge rectilinear, shorter than the greatest breadth of the shell.

Greatest breadth, from 3-5 to 1 inch. In its proportions it resembles the truncated portion of the productus of Martin, as represented on his plate 22, fig. 3. It is very common.

24. A shell of the length and breadth of three inches sometimes occurs, the convex valve of which is transversely undulated, its umbo prominent, and curved like that of a Gryphæa, its tip resting on the base of the opposite valve, which is concave, with a transverse linear base; its muscular impressions seem to have been lateral.

[*Foot note, page 151*].

25. A single specimen was found of a valve of a shell, in some degree resembling a pecten, but without the auricles. Length, more than 2 3-10 inches.

26. Productus *lineolatus. Say.* Valves with numerous, fine, equal, equidistant, longitudinal striæ, and a few small tubercles; convex valve very much elongate, its basal portion is curved downwards, almost perpendicularly with respect to the disk near the umbones.

So singular is the structure of this shell, that the internal cavity appears to have been perfectly transverse, with respect to the general length of the shell, and small in comparison with the length. It strongly resembles the Anomites productus of Martin, as represented on plate 22, fig. 102, of his Petrif. Derbi., and like that shell it is armed with small tubercles, though fewer in number, and the striæ are much more numerous and smaller.

27. Cast of a turretted univalve, probably a Cerithium, of the length of 2 1-2 inches.

28. Cast of the anterior portion of a valve of a shell like an Ostrea, of the breadth of 2 1-2 inches.

29. On the Missouri near the Platte, occur masses of rock, which seem to be almost exclusively composed of a remarkable petrifaction, belonging to the family of concamerated shells. This shell is elongated, fusiform, and when broken transversely, it exhibits the appearance of numerous

[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

cells disposed spirally as in the *Nummulite*, but its longitudinal section displays only deep grooves. The shell was therefore composed of tubes or syphons, placed parallel to each other, and revolving laterally as in the genus *Melonis* of Lamarck, with which its characters undoubtedly correspond. But as in the transverse fracture, its spiral system of tubes cannot be traced to the centre in any of the numerous specimens we have examined, it would seem to have a solid axis, and consequently belongs to that division of the genus, that Montfort regards as distinct, under the name of *Miliolites*, which seems to be similar to the *Fasciolites* of Parkinson, and altogether different from the Miliolites of Lamarck. Our specimens are conspicuously striated on the exterior, which distinction, together with their elongated fusiform shape, sufficiently distinguish them as a species from the *sabulosus*, which Montfort describes as the type of his genus. No aperture is discoverable in this shell, but the termination of the exterior volution, very much resembles an aperture as long as the shell.

The length is three-tenths of an inch. And its greatest breadth, one-twelfth.

We call it *Miliolites secalicus. Say.* Mr. T. Nutall informs me, that he oserved it in great quantities high up the Missouri.

In the same mass were some segments of the Encrinus, and a Terebratula with five or six obtuse longitudinal waves.

30. Another petrifaction, abundant in some fragments of compact carbonate of lime, also found on the shores of the Missouri, possesses all the generic characters, which we have attributed to the preceding species, excepting that in the transverse fracture, the cells distinctly revolve from the centre itself, and of course the shell was destitute of the solid nucleus as in Melonis. *Lamarck.* It has about four volutions. We have named this species, which is, notwithstanding the difference of the central portion, of the same genus with the preceding, *Miliolites centralis. Say.* As in the preceding, it is entirely filled solidly with carbonate of lime, and this substance being of a greater purity in the filled up cavities of the fossil, than in the mass, its interior divisions are very obvious.

[*Foot note, page 152*].

The latter species, we observed about one hundred miles up the Konzas river, where it forms the chief body of the rocks in extensive ranges. It seems to be a carbonate of lime containing iron.

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[Long's Expedition to the Rocky Mountains, Vol. I, 1823].

ERRATA FOR VOL. I

Bulletin No. 1

Page 9, line 16: for *Astarte collosa* read *Astarte callosa*.
“ 27, “ 25: for *filnmentosa* read *filamentosa*.
“ 27, “ 31: for *margarstacea* read *margaritaceum*.
“ 30: between *Abra nitens* and *Planaria nitens* put **nitens** Lea.
“ 34, “ 36 & 37: for *pincera* read *pincerna*.
“ 39: Expunge the paragraph headed by **sulcata** Lea.
“ 50: The errata noted on p. 6 have been corrected.

Bulletin No. 2

Page 8, line 5: for embrionic read embryonic.

Bulletin No. 4

Page 16, line 11: for *Hot Springs* read *Hot Spring*.
“ 34, “ 34: for volutious read volutions.
“ 94, “ 19: for perculiar read peculiar.
“ 94, “ 22: for specimems read specimens.
“ 104, “ 1: for *compressa* read *compressus*.
“ 105, “ 24: for (*Companile*) read (*Campanile*).
“ 106, “ 9: for *gainesensis* read *gainesense*.
“ 113, “ 19: for plantion read plantation.
“ 120: for the volume page **232** read **234.**
Plate 6, fig. 16: The Photo-Engraving Co. carelessly cut off the line showing the natural size of the shell. It is magnified 3½ diameters.
12, Explanation of figs. 4 & 5 should be followed by †'s; the last *i* in *periscelidium* should be omitted.

Bulletin No. 5

Page 38, line 2: for inclinde read inclined.
“ 38, “ 6: for CALYPTRÆE read CALYPTRÆA.
“ 58: for the volume page **329** read **328.**
“ 59, line 25: for profoudly read profoundly.

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